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Technician Paul Schoen makes simulated in-flight adjustment during avionics system checkout in space shuttle orbiter craft at Rockwell International's Space Division in Downey, Calif.

Mini Sizes Up Electronics During Flight of Enterprise

By Jeffrey Beeler
CW Staff

DOWNEY, Calif. — While an unpurged prototype of this country's space shuttle was successfully completing its first solo test flight recently, a mini-computer system was evaluating the crucial electronics that will guide and control the craft — and others like it — during the 1980s.

Scientists and engineers at Rockwell International's Space Division here used the system to test both the vehicles on-board avionics and the general purpose computer that will similarly oversee that hardware.

The test system is one of many computerized tools being used in the National Aeronautics and Space Administration's (Nasa) effort to develop a fully operational version of the space shuttle by early 1979. The latest step in that effort occurred at nearby Edwards Air Force Base on Aug. 12, when the shuttlecraft Enterprise was jettisoned from its Boeing 747 mother ship and glided to a perfect landing five minutes later on a dry lake bed in southern California's Mojave Desert.

Developing and integrating the shuttle's flight control computer with the avionics represents one of the most complex undertakings we've managed, according to Paul Ties, director

of Rockwell's Avionics Development Laboratory, where the test system operates.

Ties credited the system with cutting the lab's test data lead time to about two days. Before they acquired their current configuration, the lab's engineers often had to wait as long as four days while the results of their electronics tests were processed at

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Federal Planning Unit Urged For U.S. Information Policy

By Edith Holmes
CW Staff

WASHINGTON, D.C. — President Carter's executive branch reorganization should include the creation of a body to plan and coordinate a national information policy, according to a report released here recently by the Department of Commerce's Office of Telecommunications (OTI).

Why? Because 40% of the U.S. gross national product (GNP) is derived from producing, processing and distributing information, according to the study, which claimed to measure information's place in the national

DP Deprives Workers Of Job Satisfaction, Europe Studies Show

By Nancy French
CW Staff

TORONTO — From banks to machine shops to steel mills, workers whose jobs have been changed by computerization have been deprived of at least some job satisfaction, panel members agreed here earlier this month.

Moreover, most of computerization's social consequences are "totally accidental and when positive changes do occur, it's a result of sheer luck," according to Niels Bjorn-Andersen, an associate professor at the Copenhagen School of Economics and Social Science.

These findings were presented at the International Federation for Information Processing (Ifip) Congress 77 here recently during a session on the impact of computerization on work content and job satisfaction.

Peter Docherty, a professor of business administration at the Stockholm School of Economics, described a banking system developed on a management premise that 80% of its workers were disinterested in their work. The system, management theorized, should be as simple as possible, placing a minimum of job demands on the tellers who would be using it.

The results were surprising, he said, and were compiled through the bank's suggestion program.

Before the teller operation was computerized, tellers suggested changes that would improve customer services. They were, by attitude, mini-bankers.

After computerization, their suggestions concerned added codes, new

forms or new displays. Within a year, basic attitudes within the bank had been changed. Mini-bankers had been turned into keypunch operators, he explained.

Managers who noted the change are now asking themselves who is worrying about customers besides a few bank executives, Docherty said.

Bjorn-Andersen, who studied eight banks in Sweden, England, France and

(Continued on Page 4)

No Argument: 'DP Causes Unemployment'

By E. Drake Lundell Jr.
CW Staff

TORONTO — Computers cause unemployment.

That's about all a recent panel could agree on at the International Federation for Information Processing (Ifip) Congress 77 here.

One panelist argued that while DP causes local unemployment, it actually creates more jobs in other areas. Another contended strong unions could reduce this effect. A third pointed to a need for a dramatic change in social organization to overcome the problem.

Dr. Bruce Galkrist, director of computing activities at Columbia University, took the first position by indicating that while computers cause unemployment in certain geographic areas, in a global sense they help create jobs.

For example, he said, the AT&T workforce has dropped 7.5% in the past five years — a loss of 75,000 jobs, many directly attributable to automation. In the same time, AT&T's revenues have risen by \$6 billion.

That increased revenue is being spent on goods and services by AT&T itself or by people who get the profits from the company, therefore creating more jobs in other areas than were lost at AT&T, he contended.

Because of this, Galkrist is optimistic that on the global level computers will increase employment, even though he is pessimistic about the effects on individual workers who lose jobs through automation.

For example, he said, while there is high unemployment in the ghetto areas of New York, just 50 miles away there are job openings in high technology areas.

The problem is that we have all

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Please address all correspondence to the appropriate department at 747 Washington Street, Newton, Mass. 02160. Phone: (617) 965-5800. Telex: USA-92 2529.

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Sparked by Sharansky Case

Ifip Groups Take Stand for Rights

By E. Drake Lundell Jr.
CW Staff

TORONTO — The issue of human rights for Russian citizens arose during the recent International Federation for Information Processing (Ifip) Congress '77 where as more than 100 computer scientists signed a petition supporting the release of Anatole Sharansky, a computer scientist currently in Soviet prison.

In addition, the Association for Computing Machinery's (ACM) executive committee, which held a meeting in conjunction with the Ifip show, adopted a resolution refusing to participate in Soviet-sponsored conferences because of that country's "restraints on computer people."

The 15 participants in the Second International Chess Tournament also signed a letter to the Russians calling for the release of Sharansky.

Sharansky, the immediate cause of the furor over the rights of Soviet citizens, is a 29-year-old computer scientist charged with being an agent of the U.S. Central Intelligence Agency. He has been held in Soviet prison for the past five months.

Sharansky had attempted to emigrate from the Soviet Union to Israel. Be-

cause of this he was fired from his job and refused new employment.

He became active in Soviet dissident circles and contacted Western scientists and newsmen interested in the plight of Soviet citizens, according to a spokesman for his wife, who is now in Toronto.

Because of his activities in support of the right to emigrate, which are guaranteed by the Helsinki Convention signed about two years ago by the U.S. and the USSR, Sharansky was jailed originally for "parasitism and hooliganism," the spokesman said, and later charged with being a CIA agent.

In the past five months, no one has been allowed to see or speak with Sharansky, he added, so there is no real assurance he is even alive.

Sharansky a 'Symbol'

The ACM resolution, revealed at a well-attended, ad hoc evening session of the Congress, did not mention Sharansky by name, but referred instead to the general "Russian restraints on computer people."

It said ACM will "not cooperate with any meeting in the USSR" and that the association will "question" partici-

tion in any meeting with Russian support.

Dr. Herbert R.J. Grosch, ACM president, said Sharansky is "a symbol of a larger battle." ACM is concerned with intellectual and scientific freedom everywhere, he said, because abridgments to such freedoms "threaten human freedom everywhere."

Dr. Jack Belter, a computer scientist at the University of Pittsburgh, told the ad hoc meeting that "science can only exist where freedom of ideas can proceed."

"None of us are free until he is free," Belter said, referring to Sharansky.

Pressure Urged

Other panelists called on the assembled Ifip delegates to exert pressure in their own countries to deny Western Computer technology to the Soviets until they give the basic human rights called for by the Helsinki declarations to their citizens.

And Prof. Kelly Gollieb told the group it should threaten to withdraw contracts with Soviet scientists in such meetings as Ifip unless the Russians change their policies on such human rights issues.

In response to that plea, the ad hoc group adopted a resolution expressing our dismay of the treatment accorded to Anatole Sharansky.

Release Asked

In the remaining act, 15 members of the delegations participating in the Second World Chess Championships sent a letter to the Soviets urging them to release Sharansky, whose master's thesis dealt with programming computers for chess matches.

The group said his release "would help ensure" that contacts between Soviet computer people interested in computer chess and others of a like bent around the world could continue.

Info Sets Miniconferences

NW YORK — The latest technological innovations in information systems and predictions for information systems in the 1980s will be the subjects of a four-day "conference within a conference" at the Information Management Exposition and Conference.

About 250 speakers will address 70 sessions in 13 sub-miniconferences during Info '77, which will be held Oct. 17-20 at the New York Coliseum.

Other miniconferences scheduled in-

clude a half-day session entitled "Data Communications Planning for the 1980s," chaired by Dr. David Freeman, senior associate at Kerton, Inc., and a seminar — involving Honeywell vice-president C.A. Conover and Citibank vice-president John Gould — on the pros and cons of replacing mainframes with groups of minis.

The full program and a guide to the exposition are available from Clapp & Polak, Inc., 245 Park Ave., New York, N.Y. 10017.

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Employees Fake \$500,000 in Medicaid Claims

By Ann Dooley
CW Staff

TWINSBURG, Ohio — Tired of bureaucratic hassles with the Ohio welfare department, two employees of Revco D.S., Inc. here tried to take the easy way out by instituting a false prescription billing system. False claims amounted to more than \$521,000, according to the drugstore chain.

The two were "frustrated by a substantial backlog of billings that had been rejected by the state over a period of time," a company spokesman said. In order to expedite the process, Myron Winkelman, vice-president of professional services, and John Turk, prepaid prescription program manager, instructed their clerical employees "to doctor" Medicaid claims at two stages of the billing process, according to George C. Smith, prosecuting attorney.

Fabricated New Claims

Employees were told to make up new bills to replace those rejected by the state or fix claims rejected by Revco's own computer before the welfare office had seen them, Smith said.

Revco's computer, which handles the billing operations, is programmed to reject improper claims before they go to the welfare office in order to alleviate the number of inaccuracies encountered by that agency.

Claims are returned for reasons such as recipient ineligibility, duplication or incorrect or incomplete information, Smith explained.

Rather than resubmitting returned claims, the two employees decided to "fabricate new claims. It was easier for

them to hook a false claim onto a legitimate one than to analyze what might be wrong with a rejected claim," a spokesman at the prosecutor's office said.

The clerical workers were told to use "model claims" — prescriptions that had already been accepted by the state and paid, Smith said.

Plead No Contest

The two men pleaded no contest in Franklin County common pleas court to misdemeanor counts of falsifying prescription billings.

Judge Jay C. Flowers fined Revco \$50,000, the maximum fine for a first-degree misdemeanor, and ordered the company to pay the state the full \$521,000 in restitution. Winkelman

and Turk were each fined \$2,000.

The scheme was discovered after an Ohio welfare worker making a routine audit of prescriptions noticed pairs of prescriptions were being billed to the account of the same welfare recipient two or three days apart. The prescription numbers of the bills were nearly identical, according to Smith.

Revco said "virtually all" of the improper billings covered "actual transactions that had previously taken place in Revco stores and that involved dispensing prescriptions to welfare recipients." Some of the bills will be corrected and resubmitted to the welfare department for payment.

Investigators found 208,539 improper or disputed claims from all 139 Ohio Revco stores.

The two men acted "without the knowledge of other corporate officials," according to Smith. The company had no comment on what, if any, action it might take against Winkelman and Turk.

After the court action, the Ohio Welfare Department lifted the suspension set on Revco during the investigation.

The billings have reached more than \$700,000 and payment of the backlog will begin "subject to normal start-up measures," Revco said.

Since the scheme was discovered, both Revco and the welfare department have established new controls on paper work and computer workflow to avoid a similar incident, a spokesman said.

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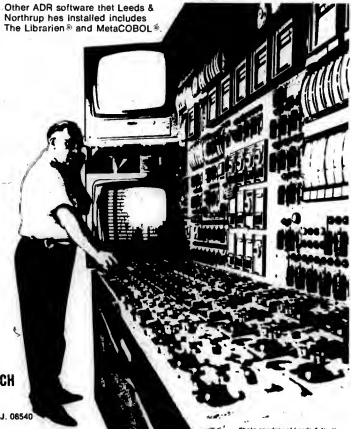


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Mass. Rebids Second Contract

BOSTON — For the second time in several weeks, the Commonwealth of Massachusetts has been forced to reopen bidding on a contract that had already been awarded.

The \$19.5 million Medicaid contract granted recently to Blue Cross/Blue Shield with a subcontract to Electronic Data Systems Corp. (EDS) was withdrawn after several other bidders filed complaints (CW, Aug. 8).

After hearing the evidence, a review board recommended to Gov. Michael S. Dukakis that all the bids be reevaluated.

The review board action followed hard on Dukakis' decision to halt a \$23 million facilities management contract also awarded to EDS, because of an apparent conflict of interest.

In that case, two members of the selection board that awarded that job were also officials of Sci-Tek Associates, a firm involved with EDS in a contract in Tennessee (CW, Aug. 15). Although Sci-Tek has been barred from further participation in the Massachusetts facilities management plan, EDS said it will bid again.

In the Medicaid case, the review board found two of the five bidders, Citibank and Pilgrim Health, were denied oral arguments to defend their proposals and clear up any misunderstandings, a spokeswoman said.

A new selection committee is being formed to look at the companies that wish to rebid.

Scandinavian Laws Give Workers Vote on DP

By Nancy French
CW Staff

TORONTO—The governments of three Scandinavian countries have passed laws to protect workers from changes in their jobs brought about by computerization, according to Niels Bjørn-Andersen, an associate professor at the Copenhagen School of Economics and Social Science.

Bjørn-Andersen, who appeared on a panel convened to discuss the impact of computerization on work content and job satisfaction, said the laws fall under the category of work protection acts. All three require systems designed to take human factors into account in designing new jobs. Bjørn-Andersen told attendees at the session held during the International Federation for Information Processing (IFIP) Congress '77 earlier this month.

Swedish Act Lacks Teeth

The codetermination act passed by the Swedish Parliament establishes as a general principle that every employee whose job is changed by computerization has a right to be consulted. However, no details or regulations back it up.

In Norway, however, the law is supplemented by an agreement between the Trade Union Association and the Employers Association. This agreement provides that companies inform the trade unions and users "at the feasibility study phase" of systems designs that would lead to computerization of their jobs.

No such principle has been adopted in Denmark.

In Denmark, Norway and Sweden about 90% of clerical workers are unionized, Bjørn-Andersen said, making such laws of significant importance to company management.

In at least two cases, systems were vetoed by union personnel under the laws, he noted. One was a one-way on-line data entry system scheduled for

implementation at a manufacturing company. After the workers studied the proposed system, a strike was threatened, he said, and management substituted a system that used interactive terminals for the one-way system originally designed.

In another case, IBM's Class package was installed in a job shop to aid in planning production, he said.

The system turned out to be objec-

tionable to workers for several reasons.

First, it was inflexible. Because of the way it accounted for manufactured items, all overtime was being scheduled on the weekends.

Secondly, it eliminated cross-contact between the workers, which they found unpleasant, according to Bjørn-Andersen, who noted this system was also withdrawn.

Studies Show DP Erodes Job Satisfaction

(Continued from Page 1)

Denmark, explained that results were not necessarily consistent from bank to bank, since each designed its computer system differently. However, in many cases work became more repetitious and routine as tellers were turned into part-time keypunchers, he explained.

In other cases, tellers actually had more time to spend with customers as the routine repetitious jobs were assumed by the computer.

All Jobs More Programmed

However, overall jobs became "more structured, more programmed and more preplanned," Bjørn-Andersen said, adding in each of these cases systems designers had "assumed there would be no changes."

Systems designers must be aware of the connection between computers and

work satisfaction. In designing systems they must take into account the psychological components of human beings — their motivations and aspirations, according to Otto Zich of Voest Alpine AG, a steel company in Linz, Austria.

Zich illustrated the magnitude of the problem by explaining that 50% of the steel mill's employees are involved in "information processing" today, compared with 15% only 27 years ago. Further, less than 10% of the steel mill's employees actually do any physical work.

It is essential that work involving computers be "humanized," he said.

Dr. Josef Hatrany of the Hungarian Academy of Sciences Institute for Computer Sciences described one system that does just that.

The system, which was implemented to speed production in a machine tool shop is designed to "make the computer" the machinist's friend, Hatrany said.

The machine room controller and the tool machine are in the workshop while the computer itself is in the computer room. The worker may have a "dialogue" with the system, he said.

He may ask the system what parts need to be machined and decide what parts he wishes to make first, for example.

Tool cutting values also may be

modified by the worker whose years of experience tell him that the parameters set by the system are not the best.

The master-slave relationship is "unambiguous," the human is always the master, Hatrany explained.

The system is designed so the worker can make decisions without modifying the computer's decision tree — and without having a confrontation with the machine, he noted.

Confrontations Human

"In all hierarchies confrontation is inevitable," Hatrany said, but this system is designed so all confrontations are human — between the workman and his human boss.

In discussing the problem with attendees, the panelists agreed that systems designers invite sociologists and psychologists to participate on design teams.

New performance measures must be developed that account for non-economic considerations, one panelist suggested.

Another suggestion was "participative design" — or involving users rather than only expert designers in the development process.

By "users" the panel members explained they didn't mean the head of the user department but rather a large number of workers whose jobs it would be "to sit at the terminals."

Mini Sizes Up Enterprise

(Continued from Page 1)

NASA's Lyndon B. Johnson Space Center in Houston and then returned here for evaluation.

Liles also credited the system with allowing his staff of eight programmers to simultaneously debug and update software for the first time since the laboratory was established in 1973.

Machines Swamped

Before they acquired their current test system, the lab's engineers evaluated their avionics hardware with a battery of five stand-alone Data General Corp. Nova 840 minicomputers. But as the number and complexity of the lab's electronic tests increased, the original configuration soon became swamped by the growing DP workload.

Moreover, the 840s could perform only one DP task at a time, Liles recalled.

To overcome these drawbacks, the lab supplemented its existing test system with seven additional minis — four for data acquisition and reduction, one for program generation and two for controlling simulation programs. "One of the computers, a DG Eclipse 5200

system, generates all the laboratory's test procedures, which it then forwards to two additional 5200s, which run the programs.

An eclipse C300 processor and three Nova 2 computers, meanwhile, collect test data and perform the arithmetic compilations used in determining test status.

Before they installed their latest minicomputers earlier this year, Liles and his colleagues in the laboratory had considered expanding their avionics test system with an IBM 360. Two factors, however, ruled out that alternative, Liles explained.

First, the large-scale system, unlike the DG minis, would not have been compatible with the lab's existing test equipment, and the cost of linking the 360 to the Nova 840s would have been prohibitive.

Second, the nature of the laboratory's hardware tests demands a real-time, dedicated computer system, not a remote batch unit like the IBM 360.

"When you're doing electronics test of this sort, you don't want to wait for your results," Liles said. "You can't afford to go into a queue or a batch mode."

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Witness Affable, Cooperative

Withington Still on Stand, IBM Trial Plods On

By Molly Upton

CW Staff

NEW YORK — As the days of summer grind on, the self-proclaimed "Son of Sam" is captured and the memories of the great blackout of 1977 begin to fade here, the U.S. antitrust suit against IBM continues to plod along, with all participants hoping for an early break in the action.

And, ironically, the man who fought hardest against being a witness for the government has now been on the stand longer than any other participant so far.

Frederic G. Withington, a computer industry expert with Arthur D. Little, Inc., fought a subpoena for his testimony here in the Second District Court for New York up to the U.S. Court of Appeals, where he was turned down. The appeals court refused to quash the subpoena because of the importance of the case and on some technical grounds.

He now holds the record of being on the witness stand the longest — 21 days — and for producing the most pages of testimony — over 3,000 — in this trial which is in its third year with little relief in sight.

Despite New York's muggy heat and length of time he has spent on the stand, Withington has been affable, succinct and cooperative — to both sides in the case.

In fact, he is quite "proud" of his record and said everything he knows about the computer industry can be found somewhere in the transcript of his testimony.

Withington's knowledge of the industry is broad enough to make his testimony of interest to both IBM and the Justice Department; while the government kept him on the stand four days for direct examination, IBM cross-examined him for 12. The remaining days have been taken up with redirect and recross-examinations.

In addition to his general knowledge of the industry, Withington brings some personal expertise to the case since he has consulted directly with some of the firms in the business including IBM itself, Honeywell and RCA when it was still active in the field.

Little Time Wasted

But while Withington's testimony has been going on, courtroom participants have been hoping for the two-week recess promised by the judge when Withington leaves the stand.

As a result, there has been a minimum amount of time wasted recently — a condition not found in earlier portions of the case.

Judge David N. Edelstein has been

DPer Sought by FBI Found Dead in Motel

KANSAS CITY, Mo. — Henry Joseph Manning III, a systems analyst sought by the FBI for embezzlement and bank fraud (CW, July 25), was located late last month "as a direct result of the photograph and article" about him in *Computerworld*, the FBI announced here last week.

Located in Denver, Manning took his life in a motel room before police were able to apprehend him.

quite abrupt with Ron Rolfe, an attorney for IBM. Edelstein has declined to hear Rolfe's reasons for objections and at least once admonished him severely, telling him to sit down.

Although David Boies — another IBM attorney — will stay on the case through the testimony of the government's main economic witness, Dr. Alan K. McAdams, Boies said he's looking forward to the vacation. After finishing up with this case, he is slated to become chief counsel for the Senate Antitrust and Monopoly Subcommittee, which is looking at various proposals to update the antitrust laws.

Another man planning to leave the case in the near future is the

government's lead attorney, Raymond Carlson, who says he's looking forward to retiring and devoting full time to the tennis court.

Carlson will be replaced by Robert Staal, formerly of the Justice Department's San Francisco office, who has been waiting in the wings since July. Staal will lead the Justice team during IBM's defense of the case.

In the past, the government had predicted it would finish its case by Labor Day, but that now appears impossible. First there will be the vacation, then McAdams will resume the stand and will probably be cross-examined for several weeks. The government then plans "a couple" more economic wit-

nesses to wind up its case.

If everything goes perfectly, one person close to the case indicated last week, the government might be finished by mid-October. Late November is probably more likely, however, he said, chuckling when asked if January wouldn't be more like it.

As usual, the contrast between the strength of the teams is overly apparent. Carlson, who fills his own water pitcher, is conducting this portion of the case with one assistant.

The IBM table, meanwhile, is replete with Cravath, Swaine and Moore attorneys Ron Rolfe, George Hritz, David Boies and Morris Waisbrod.

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Planning Body Urged for Information Policy

(Continued from Page 1)
tions and computer technologies — the core of the "information society" — the U.S. is about to become — will continue to cut across all other sectors of the economy and their impact is "too important to be left to technologists," Porat maintained.

"Decisions that are made... within the communication policy and business worlds can affect many external constituencies whose voices and concerns are not always heard by those making decisions about information technology," Porat said.

"When we restrict the scope of policy attention to the pitched battles and fireworks within the telecommunications-cum-computer world, our perspective is too narrow, and society's interest is not properly served," he added.

Coordination Missing

At a time when the successor to the industrial society is upon the U.S., the federal government lacks any information policy coordinating mechanisms, Porat stated. He suggested the creation of an "information policy forum" is "the main recommendation of this study."

Prepared by an OT research team led by Porat, the project was based on 1967 labor, economic and census statistics. It was funded by the National Science Foundation's Division of Advanced Productivity Research and Technology.

The first two volumes of "The Information Economy" contain the study's methodology, major findings and recommendations. In these volumes Porat defines "information" — "Data [that has] been organized and communicated" — and "breaks" information activity — "the resources consumed in producing, processing and distributing information goods and services" — into two sectors, primary and secondary.

The "primary information sector" encompasses firms supplying infor-

mation goods and services exchanged in the marketplace; the "secondary information sector" includes all information services produced for internal consumption within government and within noninformation firms.

Formal Set of Accounts

The report constructs a formal set of national income and product accounts for these two information sectors. Two input/output matrices provide an overview of the interrelationships among the varied types of information and noninformation activities.

The study further specifies the information-related occupations of the primary and secondary information sectors. Since the mid-1950s, the information sector has employed the highest percentage of the U.S. labor force, Porat determined.

Information policy issues tend to be "horizontal" in their impacts, he said. In his study, Porat cited as examples of these impacts "the edgy and uncon-

fortable feeling in the U.S. Postal Service as electronic mail approaches" and the "polite realignments in the finance industry as electronic funds transfer systems threaten to extinguish certain distinctions between commercial banks and savings and loans."

The federal government, however, makes policy on a "vertical basis" — within the communications and computer industries through the Federal Communications Commission, the Office of Telecommunications Policy at the White House through OT and with the "assistance" of private-sector interests, Porat noted.

Those agencies willing to tackle the economic and social conflicts generated by the introduction of new information technology applications generally do so on a parochial basis, often not even referring to the vertical issues within the communications and computer industries themselves, he said.

The "forum" proposed in the study

should be an interagency-coordinating body in the executive office of the President, Porat stated.

When the home is transformed by the communications center and the information utility, the information society will have arrived in the U.S. That is only one generation away, according to Porat, who warned that the length of time left to attack the issues brought about by information technology.

The Solution

The solution is "a coherent national information policy, and the legislative and executive will to confront the issues in a sensible manner," Porat contended.

In addition to recommending that Carter establish the forum within the White House, the study suggested the Commerce Department's Bureau of Economic Analysis review the usefulness of constructing permanent information sector accounts.

No Argument: DP Causes Unemployment

(Continued from Page 1)

lowed these disruptions to be under the control of individual companies," he said, adding companies are much more flexible than workers and can make changes — either through automation or geography — without retraining the displaced workers.

At the same time, however, automation cannot be limited, he claimed, because that would limit capital investment, which creates jobs.

"We need to relate the production of jobs with the reduction of jobs." This would take a national program and central planning in order to train workers for the jobs available and to retrain those workers displaced from one job for newer jobs, he explained.

Ulrich Briefs, a West German economist, said the problem of unemployment caused by computerization is not just one of technology, but also

of the overall stagnation of the economies of the Western industrialized nations.

Briefs, who is with the Institut des Deutschen Gewerkschaftsbundes GmbH in Düsseldorf, noted that computers are one of the most powerful labor-saving tools and are therefore primarily used as substitutes for labor. While the effects of computerization on employment are not clear now, he said computers have displaced at least as many jobs as they have created.

The effects are most visible in the clerical and production areas at present, but he warned that with the advent of heuristic programming and automated decision-making systems in the future, computers will begin to replace management-level personnel.

Today, 40% of the white-collar unemployment and 20% of the blue-collar unemployment in Germany can

be directly attributed to computerization, he said, adding that computerization accounts for about 15% of all jobs lost since 1970.

"But this is far from the peak," he said. For example, the wide-scale use of word-processing equipment in West Germany could cost as many as 1.5 million jobs in the future, he predicted. Total German DP and employment accounts for only 250,000 jobs now.

Briefs also noted that while computer stock installations have been increasing in Germany over the past two years, the nation has gone from full employment to a total unemployment rate of 4.5% at the present time.

The only way to avoid this is to get the economy growing at a faster rate than computerization so there are enough new jobs for the workers displaced by computers. This means a change in the economic system in many Western countries and more nationalization of industry, he said.

Jean-Claude Parrot, president of the Canadian Union of Postal Workers, said it is clear that employers "see the effect of computers as fewer workers and greater profits."

"Computers," he said, "have not created jobs. Computers are designed, generally speaking, with one purpose in mind — to increase the profits of the corporation which use them — not to improve social welfare, not to increase employment and not to improve the working conditions of workers."

However, unions are becoming aware of computers' impact on jobs, he indicated. "The impact of computerization will be decided, more than anything else, by the strength and militancy of the working class," he added.

Session chairman Olaf Engberg, representing the Danish computer Society at Hfp, said the discussion proved that in many ways the old economic rules are no longer working and new rules and attitudes toward employment need to be developed.

In all, public debate on the issue of computers and employment is necessary, no matter how painful, Engberg concluded.

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Panel of Experts Finds

'Social Accountability of DP' Difficult to Define

TORONTO — Just what is the "social accountability of computing?" A panel made up of some of the world's experts on the subject grappled with that question at a session of the same title during the recent International Federation for Information Processing (IFIP) Congress 77 here, but it was unable to come to any clear resolution.

"We lack good theories to predict the interplay between computers and society," session organizer Dr. Bob Kling admitted.

But work has started in developing such theories, according to Kling, a faculty research associate with the Public Policy Research Organization of the University of California at Irvine. "I hope it's not too late," he added.

Computing is clearly becoming more widespread, he said, and computer scientists and others should ensure that its effects on society at large are benign.

So far the benefits of computing systems have accrued to those organizations able to apply them; the record of benefits to the public has been "spotty" at best, he said.

In fact, he indicated, the record so far shows there are "small but precise" benefits to the "elite" from computer use and "small problems" for others.

Five Models

There are five suggested models for handling the effects of computers and society, Kling pointed out.

The first is the free market approach in which price and consumer demand are seen leading only to benign services.

In reality this does not always work out that way, Kling said, since the model assumes that there is a market with many buyers and sellers and that users can move easily from one system to another.

This model also assumes all the benefits and problems with systems are known in advance, which is not always the case, he noted.

The second model is the legislative one where laws are developed to control the unwanted effects of computerization.

The third is a regulatory model where regulatory bodies are established to monitor the effects and make computer systems accountable. The drawback here, he said, is that such bodies often become the subjects of the industry; they are supposed to regulate and sometimes act to restrain trade.

Another model is that of professional control over the technology, with professionals setting up the rules for accountability. Unfortunately, Kling indicated, people in the computer business are hired employees who can assert little control over the ways in which the technology is applied.

The final method sometimes discussed for making technology accountable to society is that of citizen action, in which citizens can bring suit or political pressure against abuses in the use of computers.

Prof. Kelly Gottlieb of the University of Toronto said there are many conflicts in the area of social accountability of computing.

Areas that are close to resolution, he said, include that of data confidentiality

and the one concerning the rights to intellectual property, such as copyrighted works, used in computer systems.

Those are primarily legal questions, he said, and are being dealt with on a legal basis. Other questions in the area of social accountability will not be as easy to resolve, he indicated.

For example, the conflicts between personal morality, organizational loyalty and professional ethics are a "searing issue" that will not go away, he said.

In addition, the problem of the profession's responsibility for influencing public opinion about issues concerning computer use is not one that will be

easily solved, he said.

However, the most pressing issue concerning the interaction of computers and society is that of employment and the effect of computers on either creating or reducing employment opportunities, Gottlieb said.

Klaus Brunnstien, a West German computer scientist, said that to date the activities of the computer field that have affected society have been minor, but warned they will grow.

"Basic knowledge of our own area is crude," Brunnstien said, adding that knowledge of computer application areas and their effects is even less well understood by computer scientists.

The profession must admit to this lack of knowledge, he said.

The computer professional needs to have more of an attitude of responsibility toward the use of his systems, he indicated, calling for more discussion of codes of good conduct and a greater emphasis on social accountability within computer science curricula.

Today there is a generally positive view among the general public toward computer systems, but this could change, he warned, just as nuclear energy was originally greeted positively but has been coming under greater criticism as its effects become better known.

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Hobbyists Seen Setting Communication Trend

By Molly Upton
CW Staff

TORONTO—Man might do well to apply what he has learned about building computer and communications systems to the social structure as a whole, according to Paul Baron, president of Cabledata Associates in Palo Alto, Calif.

The former member of the Institute for the Future envisions a world in which interpersonal international communication is greatly increased—not through any intent of large corporations or governments, but by individuals' use of micro-based packet-switching networks.

In designing a packet-switching network, for instance, one of the key concerns was redundancy "to ensure robustness," he told a session on "Data Networks—Past, Present and Future" at the International Federation of Information Processing (Ifip) Congress-77 here.

This would eliminate dependence on one monolithic structure, such as now exists with the country's governmental decision-making in one location.

The people-to-people-type structure gives society a more stable organization that is more adaptive to change than a monolithic hierarchy, he said.

Pocketbook Prices

Much of the hardware will soon exist at pocketbook prices to facilitate the people-to-people communication Baron envisions, he said.

The five major components of such a

person-to-person, packet-switched net are the user's terminal, a local distribution system, a packet-switching node, long-distance transmission lines or satellites and a host computer, he said.

The microprocessor makes the hardware needed for a node affordable for a hobbyist. One group is writing software for a distributed network that uses telephone lines, he said, adding he expects low-cost terminals will soon be available.

These can be "bootlegged" by acoustic coupling onto phone lines, whose cost is reasonable if divided among a number of users.

Also, he thinks it is possible using small ground stations to "bootleg" or spread a spectrum on satellites without detection.

"We may be entering a new era in which a small group using its own funds can build the information and network processing systems of tomorrow," he suggested.

"Hobbyists are probably having a more profound effect on technology development than even the amateur radio enthusiasts did back in the early days of radio," Baron said.

Hobbyist software tends to be better written than commercial and the hobbyists trade software and work together well, he observed.

The basic stumbling block to increased interpersonal communication over national boundaries is government controls, he said.

Perhaps it's time to consider whether these controls of communications channels should be open to the individual, he said.

Replace Postal Mail

The availability of messages could replace postal mail at less cost, he indicated. Communication that occurs in hours rather than weeks is of a different type, he added.

Bypassing government controls on international communications might enable man to do more than all the government's efforts to assure stability and peace, he speculated.

Long-term world order will occur when the disparity between the wealth of nations disappears, he indicated.

And communications plays a part in the status quo, since more than half of the gross national products of de-

veloped nations are developed via the transmission and processing of information.

Packet networks have tremendous potential and could be more important than voice telephone connections in furthering international communication, Baron said.

For instance, those in the know are quiet about the fact that the major portion of traffic is messages interchanged by humans with a relatively simple intermediate computer processing. They are not, in fact, messages from machine to machine, he indicated.

This fact is not being flaunted in order to avoid "sticky regulatory" problems, he said.

A three-minute telephone call over voice-grade can transmit 7,000 pages of text, but old tariffs block such applications.

"Thus, those who transmit data at these bargain rates do not want to talk about their loophole. In the process, however, we are concealing a major evolutionary development—a breakthrough in low international communications costs for alphanumeric text," Baron said.

Meet to Cover Transnational Data

Special to CW
PARIS—The economic and social effects of data moving across national boundaries will be the subject of a major international symposium Sept. 20-

23 in Vienna, Austria.

The Organization for Economic Cooperation and Development (OECD), with 24 member countries including the U.S., expects 250 representatives of government and private industry to hear 40 speakers present views on international computer communications networks.

OECD headquarters in Paris indicated the four-day program entitled "Symposium on Transborder Data Flows and Protection of Privacy," will concentrate on the "transnational dimensions of computer applications in terms of ensuring the security, integrity and privacy of data; the importance of maintaining the principle of free and continuous flow of information; and complex economic, social and legal problems arising from the transfer of such data.

The symposium is to be a forum for speakers from the U.S., Canada, Europe, Japan, Australia and New Zealand. They will represent different interests in transborder data communications, including manufacturing and commercial users of systems for internal management purposes; financial, banking and insurance organizations; and public administration agencies such as tax, police and social insurance authorities.

Also represented will be computer service bureaus operating internationally, data communications carriers and regulatory bodies and information and documentation service networks.

Most Immediate Issue

The most immediate and concrete issue of international interest, according to OECD, is the possible effect of emerging national privacy laws on multinational communications.

"Already some countries have indicated a preference for special restrictions on sensitive data which can be sent abroad [and some] intend to apply embargoes over transshipment of credit and other types of information."

U.S. participation is being organized by the State Department, which indicated 30 to 40 Americans will attend.

Among the U.S. speakers will be John Richardson, director of the Office of Telecommunications, Department of Commerce; Phillip Onstad of Control Data Corp., representing the Association of Data Processing Service Organizations (Adapso) international committee; Prof. Alan Westin of Columbia University; Michael Keplinger of the National Commission on New Technological Uses of Copyright Works; and Carole Parsons, executive director of the Privacy Protection Study Commission.

Oswald Ganley, a deputy assistant secretary who is responsible for this U.S. involvement in OECD, recently discussed the issues before a congressional committee.

The issues, according to Ganley, are:

- Protection of the privacy of U.S. citizens whose personal data is transferred to other countries.

- Possible adverse effects on multinational corporations that would be forced to comply with different foreign data protection laws and regulations.

- Fear of nonaffirmative barriers which might hinder or exclude U.S. firms in European markets.

- Retention of a free international flow of information, especially so scientific, commercial communications and cultural information will not be limited.

Avoidance of dislocations in commerce and industry is a prime objective of the OECD.

"Stringent regulations in some countries might lead to the creation of 'data havens,' that is, sanctuaries of data kept in more permissive countries."

"It may also be necessary to avoid unnecessary bureaucratic obstacles to transborder data movements and ensure fair competition practices," an OECD statement concluded.

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For Greater Productivity

DP Managers Urged Not to Resist Change

By Nancy French
CW Staff

TORONTO — As the DP manager strives for continuing productivity improvement, change is the essence of his work. The manager who cannot cope with change, who cannot plan for change, who cannot produce continuing change will not be effective.

This was the basic premise of a presentation by Mayford Roark of the Ford Motor Co. at the International Federation for Information Processing (Ifip) Congress 27 here recently.

Appearing as part of a program entitled "Future Directions in Information Management," Roark illustrated his point by mentioning some of the changes that have occurred during his 12 years at Ford.

For one thing, computing power has increased seven times, he said, while throughput has increased by a factor of 20.

Moreover, the company's industrial control systems, which consisted of about 400 small computers less than a year ago, have since been supplemented by 100 more.

Microprocessors, which have been in use for only three years at Ford, will have a greater impact within a decade on the company than any computer system existing today, he said.

Micros are not replacing old systems. They "have special functions for new and unreachable applications," he said. The old applications continue to grow at about 20% annually.

Explosion in Technology

This explosion in technology is in direct contrast to life only a few centuries ago, when skills once learned lasted generation after generation, or at least a lifetime.

In DP today, Roark said, many people have already "recycled" their working tools several times over.

Roark's approach to the management of change included 12 suggestions.

First, he said, system managers must be oriented to the prospects of change as something desirable — as a basis of improving productivity.

Systems should be viewed like cities — they grow, evolve and change as the needs change, he said.

Roark's second piece of advice was not to attempt too much in one step. "Such projects fail," he said, adding managers should break the long-term plan into a series of achievable projects.

Third, he urged session attendees, recognize that technology is based on group accomplishment. Even if it were practical to build one-man systems in data processing, they would not be particularly desirable since they are more subject to fraud, or abuse, he noted.

The system designed by a group "may lack the genius that a single person's project might have, but people can use it and modify it with greater ease."

Flexible Modes of Organization

Fourth, Roark suggested adopting flexible modes of organization. Don't always set up project teams where the manager functions strictly as a supervisor; seek new organizational forms that keep pace with new organiza-

tional requirements, he recommended.

Fifth, beware of trying to solve difficult problems by increasing manpower, he warned. Brook's Law states that adding manpower during the late stages of an overdue software project will only delay its completion further because of the new responsibilities and work assignments the team members will be forced to accept.

Development Tools

Sixth, use development tools such as top-down design and structured programming to make systems easier to modify. Training in such programming productivity tools was one of the most useful educational programs

Ford ever undertook, he said.

Seventh, think of systems as involving people as well as hardware and information flows. Systems should be created so the people who will use them have an incentive to do their jobs accurately, he said.

Eighth, look for secondary consequences of systems — both positive and negative, Roark urged. For example, a data base may end up having many additional useful functions, or a new management information system may create unforeseen organizational rivalries.

Ninth, seek productivity improvement within the systems function. During the 70s at Ford, the workload

increased 20% annually, but the number of employees actually declined. The DP manager should aim at annual productivity increases of 10%, he said.

Learn to use tools of planning, and always be clear about the problem to be solved; concentrate on projects that can bring the most benefits, Roark recommended.

Be Clear

Finally, "be concerned about the manager as a key resource." Don't get swept away in an effort to prove omniscience. The care and preservation of people involves creating an environment for growth as well as limiting abuse," he said.

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Erosion of Privacy by DP Avoidable: Panelists

By Molly Upton
CW Staff

TORONTO — Is the erosion of privacy an unavoidable consequence of computer applications?

Not necessarily — If timely controls are applied and if DPers address social issues rather than strictly technical ones, panelists from three continents agreed at an International Federation for Information Processing (Ifip)

Congress 77 session whose title posed that question.

Rein Turn of TRW Systems, a consultant for the U.S. Privacy Protection Study Commission, said if the proliferation of recordkeeping continues to go unchecked, it is likely that undesirable effects regarding individuals' privacy will occur.

But, he added, the adverse effects could be caused by small, well-meaning decisions

as well as by intentionally adversary decisions.

Citing driving forces behind the increase in recordkeeping, Turn said the real danger is that recordkeeping tends to be transparent to the data subject and it is therefore hard to realize that data gathering and storing on an individual is occurring.

The issue is one of control, and the laws must be dynamic to keep up with technology.

The potential for the erosion of privacy increases once the control lapses, Turn said.

"Erosion of privacy is not inevitable if controls are applied, but the potential for erosion is increasing," he warned.

Beneficent intentions can easily turn out to adversely affect privacy, he pointed out.

"One can say that the computer is intrinsically innocent — just like the Saturday night handgun," he added.

Dr. F. Hondius of the Council of Europe addressed the issue of controls on data usage and asked, "How can we know about records without resorting to records of records, which smacks of Big Brother?"

He suggested that rather than looking to an independent body in disputes, one should consider alternative forms, or self-control.

The Council of Europe is a body concerned with rulemaking among various countries of Western Europe and other Western nations over matters of mutual importance, such as data privacy.

Hondius recommended strongly that privacy legislation be enacted simultaneously at both national and international levels.

Individual Controls

A. Goldworthy, past president of the Australian Computer Society, stressed the individual must be given practical and enforceable controls over his personal data.

Privacy is a part of human rights, he said, and therefore must not be eroded. There will be an erosion of privacy if DPers address technical issues to the almost complete exclusion of social ones, such as privacy, he warned.

To provide the individual with some means of preserving his privacy, Goldworthy suggested a list of rights — to know who keeps records; to have reasonable access to records; to challenge and correct data; to be notified of changes; to designate by whom and for what purpose the data should be used; to destroy the data; and to redress through law if damaged.

Persuasion Urged

In implementing the controls available to the individual, Goldworthy stressed universal solutions are not practical since what is regarded as private in one locality is considered public in another.

In certain circumstances, persuasion may be more effective than force, he said, indicating a privacy commission in New South Wales without enforcement power has been very effective.

Public and private sectors should be under the same control in order to guard against an organization saying it needs data for matters of national security, Goldworthy said.

A balance needs to be struck between a government's concern to protect privacy and its willingness to give access, he continued.

An individual should not be allowed to determine what constitutes an invasion of privacy since he is a part of society as a whole, he stated.

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Games Leading the Way

DP To Equalize Human Race by 21st Century

By Toni Wiseman
CW Staff

TORONTO — Spurred by increasingly sophisticated computer-based games, computers will begin to equalize the human race by the 21st century since the real differences between men today are based on access to knowledge and knowing how to apply it.

This prediction was made by Chris Evans, who heads the Man/Computer Interaction Group at the UK's National Physical Laboratory, at the recent International Federation for Information Processing (Ifip) Congress 77 here.

Evans explained, however, that these are long-term effects. Others effects, both trivial and significant, will begin to show their effects sooner.

Evans defined one earlier time period as being short-term — between 1977 and 1980 — and another as medium-term — 1981-1999.

Lure of Games

Throughout history there has been a trend toward diminishing work time and increasing leisure time. Theorizing that this trend will continue and even accelerate throughout the rest of this century, Evans said, it is important to investigate the psychological factors which come into play as the amount of leisure time expands.

Significant developments between 1977 and 1980 will be in the increasing lure of games. Evans suggested that the types of games available on computers, for instance, will be very compelling and their effect on human psychology may be significant. Additionally, during this time frame the use of games as teaching aids will become widespread — as pocket calculators appear with alphanumeric displays. Finally, there will be increasing amateur software development.

By the 1980's, there will be considerable interest in computer modeling for making decisions about one's own life. "The computer can certainly be more objective, so the individual may benefit in the end," Evans stated, noting that this type of development will have potent effects on society.

In the medium term, the quest for more sophisticated and elaborate games may well give some insight into the psychology of human thought and decision processes, he said, predicting as well that the computer will beat a grand master and become the chess champion of the world during this time.

The significance of this feat is a global, conceptual one, he said, since it will mark the first time there will be no question the computer is involved in an intellectual process and is good at it. In addition, the first major impacts of computerization on labor and employment will begin to be felt and, as a result, there will be more concentration on what man should do with his spare time.

This will result in the first consideration, the first questioning, of the value of the work ethic, Evans predicted.

Significant Changes

No predictions on the nature of the livable effects of computerization on society can be made for the long term;

it is simply too far out, Evans said. But there are several significant changes which can be forecast.

One "eerie" effect will be the advent of the first "really good" artificial intelligence system, which may well be an exceptionally good companion, Evans said. Intellectual exchanges with such systems may prove to be very interesting, perhaps more interesting than with humans.

In addition, highly sophisticated games with enormous simulation properties may make people more introverted and cut down on the amount of travel they do, he said, noting the effect this could have on the world's economy.

The need for social contact may well lessen, Evans suggested, citing documented cases in which health authorities have found the students who interact for long periods with computers were more strongly oriented to the machines than to people and had psychological problems.

At this point in time, major decision making on personal and social problems may be done on computers. In fact, it may be "the only way to go," he said. The psychosocial consequences will be enormous, he pointed out.

Finally, present political systems, which are based in the past, will be unlikely to survive in the world of that day, he said. They will simply not be

able to adjust to the rapid rate of change.

Two things are likely to arise in the future, Evans said. First, man will no longer be diverted by the need to work; working will no longer be "the real thing."

Secondly, as a result of the first, man will be forced to start looking at the nature of the human mind and at the nature of the universe, both of which he currently knows little about.

"This all sounds optimistic," Evans admitted, but "it may be that knowing too much about the universe and ourselves is not desirable. It will definitely be a shock, and not necessarily a pleasant or good one."

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DP Ombudsman Tackling Consumer Gripes

By Nancy French
CW Staff

TORONTO — The Canadian Information Processing Society (Cips) is operating an ombudsman service here and in Vancouver to help consumers deal with problems arising from their relationship with computers.

James H. Finch, who serves as the Toronto-area ombudsman, said the service was established to serve as a back-line resource for the many other ombudsman-type organizations that already exist, rather than to usurp their authority.

The idea was born in Vancouver two-and-a-half years ago when Ted Sterling, a Cips member who heads the Computer Science Department at Simon Fraser University, joined forces with the Consumers Association of Canada and volunteer caseworkers recruited from the school. This three-part team was aimed at helping business and government DP departments.

The ombudsman tackles a consumer's problem only after the consumer already tried to solve it himself and failed, Finch said.

The Toronto service was established in February. Business for Finch and his 14 volunteers was "pretty slow" for the first two months because the news of the service "wasn't getting to the man on the street," he explained.

Now, however, the ombudsman has handled about 18 cases, many of which were resolved in less than an afternoon, he said.

One case resolved recently involved a

firm that couldn't seem to get its tax refund from the Department of National Revenue (comparable to the U.S. Internal Revenue Service).

The case had "ping-ponged between the regional and national offices, Finch said, and his group expedited the thing through the DP department, quickly resolving the problem.

Finch said DP departments are frequently "embarrassed into making the changes. We're actually commissioned on behalf of the DP community to per-

form this service."

As a by-product to solving individuals' problems, Finch's group hopes to provide feedback to industry on what some of the typical problems are and to eliminate them at the source.

As for why companies allow consumers' problems to occur and then go on so long without being resolved, Finch said many of the companies' DP departments are "too busy on programming. They don't spend time on the user interface. Further, the systems

are biased toward the provider of the system rather than the customers."

Still another reason, according to Finch, is that programs are not properly debugged. Because of costs, many DP departments are preared to live with a few problems, he added.

The Canadian program is different from the ombudsman program established by the Association for Computing Machinery in the United States in 1971, according to Dahl Gerberick.

Call for Papers

1978 INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS IEEE REGION FIVE ANNUAL CONFERENCE, Tulsa, Ok. April 16-18, 1978

The theme of the conference is "Energy '78." Topics will include new energy sources, energy conservation, control and instrumentation of energy systems, energy transmission and transportation systems, energy storage, economics of energy systems and interactive, efficient utilization of energy resources.

Three copies of 200-word abstracts should be sent by Nov. 1 to Dr. R. Runkel, Technical Program Chairman, School of Electrical Engineering, 200 Engineering South, Oklahoma State University, Stillwater, Ok. 74242.

EIGHTH CONFERENCE ON COMPUTER AUDIT, CONTROL AND SECURITY, New York City, April 10-13, 1978

Papers are requested on any aspect of DP audit, control and security, particularly how-to papers, case histories and accounts of personal experiences with enhanced systems. Papers outlining the development of new techniques or modifications of old ones or providing insight into problems facing computer audit, control and security professionals are also being sought.

A one-page abstract, along with a brief personal resume, should be sent by Nov. 1 to Harold Weiss, Program Chairman, Automation Training Center, Inc., 17, 11250 Roger Bacon Drive, Reston, Va. 22090.

PERCOMPT '78, Long Beach, Calif. April 28-30, 1978

The topic is designed with the home computerist and busi-

ness person in mind. Technical papers are encouraged in the following areas: hard radio communications or computer and amateur radio, speech synthesis and recognition, pattern recognition, multi-media generation, programmed learning applications, AI-also architecture, real-time machine control, software tutorials and business applications.

Three copies of an abstract, in English, should be sent by Oct. 31 to James H. Lindstedt, Percomp '78, 1633 E. Seawall, Suite 101, San Jose, Calif. 95125.

NATIONAL MICROGRAPHICS ASSOCIATION'S 27TH ANNUAL CONFERENCE AND EXPOSITION, Boston, Mass., May 6-12, 1978

Papers are requested in the areas of technology, fundamentals, instrumentation, applications and other special interest papers covering the broad field of micrographics and related information-processing fields.

Possible topics include source document preparation; reader/reader-printers and enlargers; related devices, cameras and duplicating; COM start-up/COM ongoing; COM graphics; computer-assisted retrieval; standards; privacy legislation and freedom of information; micrographic systems and design; service bureau and/or in-house microprocessing; word processing and micrographic; non-impact printing and/or COM.

Abstracts, typed double-spaced and at least 250 words long, should be sent by Sept. 1 to R. H. Kinney, Micrographics '78, Program Review Committee, National Micrographics Association, 8728 Coesville Road, Silver Spring, Md. 20910.

1978 NATIONAL COMPUTER CONFERENCE, Anaheim, Calif., June 5-6, 1978

Papers and session proposals are welcome. Emphasis will be on the following areas: applications — word resource planning, supervision and development with emphasis on energy; electronic funds transfer; office automation; image processing; artificial intelligence; special-purpose terminals and systems; design automation and graphics; computers as a component of end-user products; small business; manufacturing and process control; data entry; personal computing; and emulation.

In methodology and technique, papers are invited on software tools and techniques, programming methodology, DP management and administration, performance measurements and evaluation and automatic programming.

In people and society, the emphasis will be on legislation and its impact, communications and regulatory policy, computing careers and education, privacy, security and computer abuse.

In systems, NCC will emphasize computer architecture, impact of new hardware technology, distributed systems, data networks and communications, data base management systems, programming and operating systems.

Short papers of 2,500 words and long papers of 4,000 words will be considered. Include six copies of the paper and six copies of a title page containing title, 150-word abstract, four to six key words descriptive of the content, author's affiliation, telephone number and mailing address.

Submissions should be sent by Oct. 21 to Dr. Leonard V. Liu, NCC '78 Program Chairman, IBM Research Laboratory, 5600 Cottage Road, San Jose, Calif. 95119, or to Dr. S. P. Ghosh, NCC '78 Program Vice-Chairman, IBM Research Laboratory, 5600 Cottage Road, San Jose, Calif. 95119.

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INFO	12/456/885	14 45 11	77 180	OMEGAMON	V100	DYNAMIC	= 4	SYSDO	LOG					
BATX	PAYROLL2	SORT19	TEST72	KMB13	SORT21	TEST18								
STEP	GO	SORT1	XXX	LINK	SORT	STEPI								

EASY	HIGH CPU	101%	<<SRM REDUCING SYSTEM MPL>>											
SIC JES2	WAIT	1 17 MN	1 6 5 SPOD12	<<RESERVED>>										
TSO USER192	ELAP	3 38 MN	2 4 6 8 10	<<MINUTES IN TRANS>>										
	SWAP	2 43 MN	DET WAIT	1 6 3 WORK18	RESERVE									
TSO USER191	ELAP	7 08 MN	2 4 6 8 10	<<MINUTES IN TRANS>>										
	SWAP	1 14 MN	UNLABLE	SWAPPED BY SRM										
BAT PAYROLL2	ELAP	1 23 HR	10 20 30 40 50 HR	23 18 MN	<<TAPE MOUNT>>									
	WAIT	2 22 MN	4 3 0 0	<<DATA SETS>>										
BAT SORT19	SWAP	18 02 MN	DET WAIT	<<ENQUEUE ON	PAYROLL2 (EXC)									
	EXC	END SYSDO	SVST1 PROCLIB	<<SWAPPED BY SRM>>										
BAT TEST72	SWAP	2 22 MN	EXCHANGE	<<SWAPPED BY SRM>>										
BAT KMB13	SWAP	8 23 MN	EXCHANGE	<<SWAPPED BY SRM>>										

SCPU15	%CPU	0	10	20	30	40	50	60	70 80 90					
CIES	15 21													
SORT1	21 08													
USER7	45 11													

OMEGAMON using a dedicated 3270 in an MVS operating environment.

OMEGAMON displaying exception information and tasks with high cpu utilization.

How many of these problems do you have?

Tape Mounts?

BAT PAYROLL2 WAIT 2 23 MN 3 8 8 <<TAPE MOUNT>>
Batch job PAYROLL2 waiting 2 minutes 23 seconds on a tape mount.

Enqueue Waits?

BAT SORT19 SWAP 18 02 MN DET WAIT <<ENQUEUE ON DATA SETS>>
PAYROLL2 (EXC)
EXC END SYSDO SVST1 PROCLIB

Batch job SORT19 swapped out (detected wait) for 18 minutes 2 seconds due to enqueue on data set 8Y81.PROCLIB currently held by job PAYROLL.

Dasd Dropped Ready?

+ DANGER DASD DROPPED READY AT ADDRESS 182 *****
+ CURRENT USER JES2 *****
+ VOLUME MY8RES *****
+ DEPTH OF I/O QUEUE 4 *****

Dropped ready exception indicates address, volume, user and number of I/O's waiting on device.

Initiators Tied Up?

BAT PAYROLL2 ELAP 1 23 HR 10 20 30 40 50 HR 23 18 MN
BAT SORT19 ELAP 3 38 MN 2 4 6 8 10 20 30 40 50 HR 23 18 MN
BAT TEST72 ELAP 12 03 MN 10 20 30 40 50 HR 23 18 MN

Elapsed time exception analysis for batch jobs. Thresholds are assigned on a job-class basis (1 hr for PAYROLL, 10 min for SORT19 and TEST18). Elapsed time is on left, "over-time" on right, and plot of over-time in between.

TSO Response Time?

TSO USER192 ELAP 3 18 MN 2 4 6 8 10 (MINUTES IN TRANS)
TSO USER191 ELAP 7 08 MN 2 4 6 8 10 (MINUTES IN TRANS)

TSO response time exception analysis. Time thresholds are assigned on a transaction "period" basis.

PERF02 PRO 01 = TRANS 78 SWAP TRANS 1 0 RESPONSE (SEC) 4
PERF02 PRO 02 = TRANS 175 SWAP TRANS 1 0 RESPONSE (SEC) 2 1 =
PERF02 PRO 03 = TRANS 64 SWAP TRANS 1 0 RESPONSE (SEC) 7 3 =
PERF02 PRO 04 = TRANS 10 SWAP TRANS 1 0 RESPONSE (SEC) 12 6 =

TSO response time information by period number (i.e. by complexity of transaction).

Reserve Lock-outs (Multi-system environment)?

SIC JES2 WAIT 1 17 MN 1 6 5 SPOD12 RESERVE
TSO USER192 SWAP 2 43 MN 1 6 3 WORK18 RESERVE

In a multi-system environment with shared dasd, RESERVE lock-out detection can be crucial. When running V-R and EXCP on a 3270, OMEGAMON requires no I/O to dasd devices or control units and is not affected by console lockouts (WTO/WTOR).

SRM Swaps?

EASY	HIGH CPU	101%	<<SRM REDUCING SYSTEM MPL>>						
TSO USER192	SWAP	1 14 MN	UNLABLE	<<SWAPPED BY SRM>>					
BAT TEST72	SWAP	2 22 MN	EXCHANGE	<<SWAPPED BY SRM>>					
BAT KMB13	SWAP	8 23 MN	EXCHANGE	<<SWAPPED BY SRM>>					

SCPU15	%CPU	0	10	20	30	40	50	60	70 80 90
ELAP	11 18								
CIES	15 21								
SORT1	21 08								
USER7	45 11								
TEST72	13 27								

The high cpu utilization causes the system resources manager to reduce the number of active tasks (MPL) in the system. As a result we see a TSO user having to wait for 1 minute while 2 batch initiators are frozen for a total of 11 minutes. The SCPU15 command selects any task using more than 10% of the cpu. (Note TSO user USER7 had 45.1% cpu utilization which indirectly caused the batch jobs to be swapped out)

Storage Exceptions?

TSO USER22 EXCESSIVE WORKING SET SIZE= 800K
EXCESSIVE WORKING SET SIZE= 100K
BAT SORT21 EXCESSIVE FIXED FRAMES= 180
BAT PAYROLL2 EXCESSIVE SWAP COUNT= 51

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Inconsistent Data Seen Major Snag in Planning

By Molly Upton

TORONTO — The bane of corporate planners is inconsistent data garnered from various operating units, panelists indicated at a session on "Interactive Approaches to Corporate Planning and Control" at the recent International Federation of Information Processing (Ifip) Congress 77 here.

What is needed is a higher construct language that requires uniform data and allows planners to access information on such concepts as unit maintenance cost, according to Paul Strassmann, director of administration at Xerox Corp.

Amidst several supposedly happy users of APL, Strassmann said "APL as a planning language is dead, to overstate the case." In due course it will be dead, since it is hard to use as a "lingua franca."

He asked time-sharing vendors to diversify their syntax into other aggregate levels of expression as a means of moving toward the higher construct languages.

Strassman said he urges the people who invented APL to try to bridge the gap and take the discipline of data base management into the unstructured world of the planning organization.

He added he was addressing no one in particular, but the audience chortled since I.P. Sharp, one of the inventors of APL, was the chairman of the session.

It is necessary to reveal in an understandable manner the logic and the source of the data underlying the constructs, Strassmann added.

Distributed Function

Strassman envisions the database management function being distributed into operating units. There will be more interdisciplinary use of the planning data, for instance, by marketing and manufacturing departments, he said.

While other panelists described their use of APL and praised its conciseness and interactive abilities, they did indicate they have trouble obtaining data from different operating units that is consistent.

Sharp, of I.P. Sharp Associates, Ltd., described corporate planning as applying exact methods to hopelessly inaccurate data. "But that adds to the fun," he remarked.

Morris Elliott, general research manager for Massey Ferguson Ltd., said the firm's organization along decentralized lines often makes it difficult to combine data from the different operating units.

Elliott's unit stresses giving practical, down-to-earth assistance to planners, he said.

In order to coax the operating units into collecting the desired data, Elliot's group in turn tries to provide them with systems that help in planning. "We can't expect the operating units to supply data if they can't use it themselves," he observed.

Massey Ferguson's system is easy to use for business analysts without programming knowledge, he said. It encourages the decision maker

to experiment with the data, although he admitted it is not the executive but the business analyst that sits at the terminals.

The firm is starting to initiate a data base type of approach, he said. "By adopting a data base we hope to eliminate arguments over whose data is accurate," Elliott added.

Leo Kahn, head of the operations research department at

the Nederlandsche Middenstandsbank in Amsterdam, said the bank uses simulation models, plugging in specific companies, to estimate such factors as credit worthiness.

John White, a planner in the Wellcome Foundation, Ltd., a drug company, said only simple and financial modeling has any place in real-life planning.

Planning systems must be along the lines of personal models that can be under-

stood, he said. Although DP tends to err on the point of incomprehensibility, it can be timely, he admitted.

Wellcome converted to DP and APL in 1975. It wrote its own macro language that allows overseas companies to access its data, White said. The whole conversion was "done rapidly and cheaply and accepted readily by an organization very unsophisticated in DP use," he added.

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DL-1	2.8	2.4	2.3	2.4	2.4	2.5	2.6
IDMS	3.8	3.3	3.4	3.6	3.0	3.6	3.5
SYSTEM 2000	3.0	2.6	3.0	2.5	3.0	2.5	2.6
TOTAL	3.5	3.1	3.4	3.4	2.8	3.0	2.8

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Systems Consultant Contends

Distributed Processing Not Commercial Reality

By Nancy French
CW Staff

TORONTO — Although trade journals "laud the number of distributed processing systems available," from an information standpoint there are no commercially marketed products that actually provide for management of data structures at multiple sites, according to Kurt Ziegler Jr., a sys-

tems consultant with IBM in Gaithersburg, Md.

Speaking at a session entitled "Future Directions in Information Management" at the recent International Federation for Information Processing (Ifip) Congress 77 here, Ziegler told his audience that information systems control essentially four types of distribution: distributed func-

tions, distributed systems, distributed processing and distributed data.

"Although many installations use some form of distributed systems, few vendors actually provide such facilities as part of their information systems offerings," he said.

Distributed processing is just now becoming a viable alternative to the single-host

approach for distribution of data and processing, he said.

Distributed Functions

The only equipment currently available is that which distributes functions, Ziegler said. In this category he included intelligent terminals, which provide basic editing features, clusters, which provide source data editing and

some simple status facilities; front-end processors, which provide transmission, conversion and routing facilities; and now "back-end processors," which provide data retrieval and output services.

As for "distribution of systems," Ziegler pointed out that large multinational corporations have distributed systems for years — and that these systems aren't necessarily small ones, either. Here each installation typically has its own DP staff and specific business systems and appears as an "autonomous entity."

However, when it becomes necessary to exchange information between the users of the systems, it is done through a message-switching facility. This arrangement lets the user enter data at his terminal; the switch routes that information to the destination system.

Transactions requiring access to data at multiple sites can be accommodated via store-and-forward techniques, although these can present significant transmission time and volume overhead penalties as well as system recovery exposure, Ziegler warned.

An alternative approach to the store-and-forward distributed systems for multiple locations data requests is distributed processing, he said. Here the front-end function must route not only by transaction type, but also by content, he explained.

The first execution point becomes the anchor point, he said. This application program buses transactions to other processors to access remote data; unlike the store-and-forward approach, the originating transaction does not terminate until all the transactions respond to the originating transaction.

The response then goes from the originating application program to the requestor.

Distributed processing appears to meet the goals of off-loading and availability, although it can dramatically affect response time while at the same time exposing the data base to some erroneous data, he explained.

Distributed Data

"Distribution of data" is the last variety of distribution Ziegler described. This, he said is the "easiest type to program," although it is "the most complex for the information system to support in terms of performance, control, recovery and synchronization," he said.

If the processors are geographically distributed, the same response exposure exists as for the distributed processing environment.

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TASK/MASTER	3.3	3.2	2.8	3.3	2.5	2.7	2.7
ENVIRON 1	3.1	3.1	3.2	3.1	2.3	2.5	2.5
CICS	3.1	2.8	2.4	2.8	2.8	2.9	2.8
INTERCOM	2.7	2.8	2.2	2.5	2.1	2.1	2.5
IMS/DC	2.8	2.5	2.4	2.5	3.0	2.9	2.8

*All weighted averages are based on a scale of 4.0 for excellent.
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All figures based on latest available Datapro survey

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—David Harp, Director of Data Processing, New Castle County, Del.

"My programmers say DATACOM/DC is very easy to use; as simple as writing a COBOL program. The documentation also is very good. Technical enough for the technical people yet simple enough for management people to understand."

—Harvey Kennedy, Vice President and Director of Management Systems, Southern Baptist Annuity Board (Dallas).

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—Ben Driver, Data Base/Data Communications Software Manager, Brockman On-Line Systems (Houston).

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Experts Urge Simple Interface for Naive Users

By Toni Wiseman
CW Staff

TORONTO — Systems designed for use by "the naive user" should keep the complexity within the computer, not at the terminal, a panel of experts agreed here recently.

Unfortunately, that is easier said than done, attendees of the International Federation for Information Processing (Ifip) Congress 77 were told.

As you make the system ap-

pear simpler to the user, you inevitably make the software more complex, Don Bitzer, director of the University of Illinois' computer-based educational center, admitted.

Bitzer defined the "naive user" not just as one who is computer knowledgeless in terms of DP, but also as anyone who is physically handicapped and therefore may not have acquired certain communication skills.

In fact, he said, even DP experts might be categorized as naive because they may know nothing of a particular computer-based system.

In outlining some of the criteria which have been used in the development of the Plato system, Bitzer emphasized the importance of keeping the target audience in mind, since most other criteria hinge on that point.

To be successful, com-

munication with the user must be direct, he said. This means the computer must be able to communicate in a variety of ways.

Information must also appear to the user in a natural way.

The system must also be able to interact with the user at the conceptual level, he said.

Linguistic Issues

Sabina Rohlfis of Soflita

GmbH, Germany, described some of the finer points behind the linguistic issues in communications with naive users.

She defined a naive user as anyone who has to use a computer to do a job in which he previously communicated with another human. This means the computer is simply a special-purpose machine and therefore needs instructions for use just as would be provided with a washing machine or a car.

Three Points

Rohlfis observed that the three main points in language design are to make the commands simpler, provide explanations in short sentences and adjust the language to the specific target group. For instance, if asked a question such as "Do you suffer from headache or cold?", depending on his familiarity with the study of logic a user might interpret "or" as meaning "either/or" or alternatively as meaning "both," she said.

Human-to-human communication includes both a content aspect and a relation aspect, she noted.

With a computer, the content is translated into a digital form with a syntax.

The relation aspect, however, is analog communication which has no clear syntax from which to draw a conclusion. She illustrated this point by noting tears could imply either joy or sorrow. "And there is no way to include this aspect of communication in a computer system," she told attendees.

Office Systems

Jim Bair, senior information scientist at Stanford Research Institute, examined some of the problems with office information systems, some solutions and some of the problems with the solutions.

The problems include the "incredible" spectrum of users with their variety of job types and organizations, the wide range of potential services desirable and the heavy usage imposed on a system if all services are available to all users.

Further Complication

The tremendous variety of hardware, software and networks available and the rapid change in people and technology further complicate the situation, he told Ifip attendees.

By way of solutions, Bair proposed one single language for all commands and communication. This language, he stated, should be a subset of natural language with one consistent syntax. This language should be used for both current and future systems, he stated.



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UK's Tricker Believes

Corporation's Structure, System Interdependent

By Molly Upton
Insert Here

TORONTO — Which comes first, the organizational structure or the information system?

The two are interdependent and, in fact, it is feasible to develop an organizational structure based on the design of the information system, Robert I. Tricker, director of the Oxford Centre for Management Studies, told a session at the recent International Federation for Information Processing (Ifip) Congress 77 here.

The issue is what kinds of interdependence ought to be developed, rather than which is dependent on the other, Tricker said.

The role of the information systems planner is therefore expanding to encompass influence on the corporate structure and, indirectly, possibly even on future society, he speculated.

Often there is a generation gap in management's conception of the role and potential of information systems, he told the session on "The Impact of Information Systems on Organizational Thinking."

"The changing role of management, from responding to environmental change to causing it, places a new dimension on the need for information in management decisions," Tricker said.

"There are emerging pressures which identify information with power. And many existing information systems fail to respond to these contemporary needs."

"By thinking of management information as the outcome of human processes, looking beyond the technical and operational levels, the information system designer is contributing to the evolution of his organization to higher levels of coherence, connectedness and fruitfulness for all concerned. He may also be enabling it to survive," Tricker commented.

Data vs. Information

There is an important distinction between data and information; information "is a function of the user and his environment as well as of the data made available," Tricker stressed. "We have probably not thought enough about the process by which data becomes information at the strategic decision-making levels," he continued. "In high-level decisions, information is not a commodity to be moved, stored and traded; it is, as

[Norbert] Wiener said, what changes us, and change implies process."

Information "results from an idiosyncratic process of using data by individuals in specific circumstances," he explained.

The epitome of formulating information

'The epitome of formulating information is the association of two previously unrelated planes of data in a resultant idea or concept.'

tion is the association of two previously unrelated planes of data in a resultant idea or concept, according to Tricker.

Building on his thesis of the interdependence of the information system and of us involved in information development are in the business of facilitating the process by which information is created."

One way to accomplish this would be to "increase the information potential—that is, to heighten the probability of two or more apparently unrelated planes of data being associated to trigger an information response in the recipient user."

This means "including the decision maker in the higher level information system. He is the information processor in the loop, supported by operational and technical level data processing."

"The power of this interaction, with modern technology and comprehensive operating level support, has a high potential."

This does not necessarily imply massive on-line support to the board room or executive desk. It does mean much closer interaction and the facilitation of search processes," he explained.

"But just as the information systems for management that have been developed to date have tended to concentrate on making data available, so management education has concentrated on the user, attempting to broaden his ability to identify his information needs and to obtain value from the data available to him. Perhaps

the time is ripe to combine the two."

In the next stage of organizational evolution, the higher order of organization "are those with the more coherently connected and interrelated parts."

Rather than being simply an increase

in the number of communications channels, organizational intelligence may "simply unnecessary complexity, by concentrating on the development of coherent, related and fruitful systems at the technical and operational levels," he said.

"The job of the information systems planner operating at this level is to improve organizational intelligence by increasing the information potential and thereby enabling the organization to respond to environmental change and to cause it," Tricker said.

Participants in seminars at the Ox-

ford Centre have indicated top management is concerned with information and power, he said. The three things expected to have the greatest impact on information system development in the next decade are internal organizational problems, involvement in the organization by third-party interests and external factors Tricker indicated.

"The new challenges" faced by management in large organizations point toward new horizons for those responsible for information and control system developments in those organizations," he observed.

With the pressure for "industrial democracy" has come the increasing importance of information.

"Those with access to information and particularly those involved in its communication and supply can be on the cutting edge of social change. No longer is information the apparently free good available to economic man. It can be looked as a costly yet highly valuable resource," Tricker concluded.

Users' Report...

"Winning Proposal" Winning Big!

A step-by-step guide to proposal preparation entitled *How to Create a Winning Proposal* is helping computer/EDP marketers score big wins in their proposal efforts. In a recent publisher's survey, users of the book reported an impressive 42% average increase in the success-ratio of their proposal projects during the past year. Of the users polled, 68% attributed their successful track-record to the guidelines provided in the book.

Disbursed "Winning Proposal" in marketing circles, *How to Create a Winning Proposal* is rapidly becoming the standard text for use in computer/EDP hardware, software and service company proposal efforts. The book covers the entire proposal process... giving detailed instructions on contents, structure and methods of preparation for both solicited and unsolicited proposals. Technical, cost and management section checklists are included to ensure the proposal team of covering all the important bases.

Government requirements are covered in an overview of the U.S. procurement network, how it works, and how the proposing firm can increase its "win probability" in competing for contracts. Excellent guidelines on how to analyze and respond to RFP's, RFQ's and IFB's are also included.

Copies are available pre-paid only from Mercury Communications, Inc. 730-CW Mission, Santa Cruz, CA 95060. \$55 includes 3-5 day delivery inside USA. In Calif. add \$3.12 tax.

Afips Publishes NCC Papers

MONTVALE, N.J. — The proceedings of the 1977 National Computer Conference held last June in Dallas have been published by the American Federation of Information Processing Societies (Afips).

The 1,000-page hardcover publication includes 132 original papers presented at the conference on such topics as data base administration, computer systems architecture, computer graphics and clinical applications of computers (Afips).

Microprocessor architectures, software management, computer hardware design, data structures, applications of computer networks and personal computing are also covered.

Copies of the proceedings are available for \$60 each from the Afips Press at 210 Summit Ave., Montvale, N.J. 07645. Members of Afips constituent societies will receive a 50% discount if their orders are prepaid.

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Editorials

Outstanding Event

The effect of computers on employment. The social accountability of computing. Computers and leisure time activities. The effects of computers on job satisfaction.

There were sessions on all these important topics, plus more than 100 others dealing with every conceivable subject in the world of data processing, during the recent week-long Congress 77 held by the International Federation for Information Processing (Ifip) in Toronto. The program was clearly the best ever in terms of content — and not only the best ever for Ifip, but also the best for any conference designed for people in the computer community.

Ifip, with its strong international spirit, draws from among the most thoughtful people in the DP field around the world. This was clear not only in the organized program, but also from the well-prepared audience questions and from the general discussions around the session areas and exhibit floor.

Of course, with only 9,000 attendees the show did not compare with the attendance at the National Computer Conference in the U.S., the French Sico or the German Systems 77. But in many ways a comparison in terms of numbers alone is unfair.

The other shows were primarily occasions for the industry to display — and sell — its equipment. They are made more palatable by technical sessions which range from the excellent to the mundane, but not match the intellectual stimulation and thoughtful discussions of Ifip. Unfortunately, it will be another three years before the next Ifip show, and that one will be a long way from home for U.S. and European attendees. It will be held for one week in Tokyo and another week in Melbourne, Australia.

But for those who will be able to attend that show, it will be worth their while, even if it is just as meaningful as the recent Toronto session.

Say Hello

A frequent theme of the recent Ifip show was the need for increased interpersonal communication among the people in the DP world and among the users of their wares.

This is a hopeful sign. Admittedly, DPs may have taken a long and tortuous path toward the conclusion that what is important is not really data; but rather communication with others.

According to both prepared and impromptu remarks at Ifip, many DPs are now realizing the technology of computers and communication both on a national and international level.

But in the meantime don't forget that interpersonal communication can also be a very simple function performed without the aid of machines.

Say hello to your neighbor today.

Letters to the Editor

DOD's Software Spending

The Aug. 8 issue of *Computerworld* contained an article ["PDP-11 Leading Choice for Military Standard"] mentioning the selection of the PDP-11 architecture as the leading candidate for the standard computer family architecture. In that article it was also mentioned that the Department of Defense (DOD) "spends \$3 million on software development, according to figures from the Office of the Secretary of Defense."

Actually, I think the quoted \$3 million was a typographical or transcription error. The real figure was closer to \$3 billion in 1973.

Quoting from a paper on life-cycle cost modeling of computer family architectures that appeared in the 1977 National Computer Conference Proceedings: "D.A. Fisher [ADP Costs in the Defense Department, Institute for Defense Analyses, Arlington, Va., October 1974] estimated in fiscal year 1973 DOD spent \$6.2 billion to \$8.2 billion on ADP. He found that approximately one-third of this amount originated in each service and that about 16% of the total went to computer hardware, 45% to software and 38% to other ADP costs, such as support and supplies, keypunching, and computer operation."

"Using these figures we deduced that \$1 billion to \$1.3 billion went to computer hardware and roughly \$2.8 billion to \$3.7 billion went to software."

John J. Cornyn
NSTL Station, Miss.

Wanted: Legal/DP Dialogue

In recognition of the frequent legal and ethical problems raised by *Computerworld's* articles and readers' letters, it might be of interest and mutual benefit to start another level of discussion.

I am presently chairing the subsection on Computer Abuse,

Science and Technology Section, American Bar Association. The members of this subsection have requested me to develop a dialogue with any organizations and/or individuals in DP who would be interested.

Object: mutual understanding of our two professions' problems in our inevitable relationships.

I can be reached at the District Attorney's Office, Planning Section, Alameda County Court House, Oakland, Calif., 94612.

Donald G. Ingraham
Senior Trial Deputy
District Attorney
Oakland, Calif.

SSN as Private Property

Although I agree with the need for strong privacy standards, I disagree with Steven Seltzer's letter and *Computerworld's* "Oops! We goofed!" [CW, Aug. 8].

The rights of an individual in privacy are dramatically altered when his criminal acts destroy the rights of other members of society. The criminal was misusing the Social Security system. How else could CW alert possible victims to this misuse without publishing the "alias" Social Security numbers (SSN) the criminal used?

If the SSN is to be held in the same regard as private property (with respect to search and seizure), then let's require a court order for its use in criminal investigations, not ban it completely.

Abbot Fleur
New York, N.Y.

Computerworld welcomes comments from its readers. Preference will be given to letters of 150 words or less. Letters should be addressed to: Editor, *Computerworld*, 797 Washington St., Newton, Mass. 02459.

Data Past

Five Years Ago
Aug. 23, 1972

BOSTON — Virtual memory systems scored high marks in IBM 370/145 user tests. The Model 145 users who field-tested OS/VS1 found throughput equal to or better than what they were getting under OS/MFT, an IBM spokesman reported.

BOSTON — The founder of the Association for Computing Machinery (ACM) blasted the group for its failure to investigate whether computer applications are good or evil. The Special Interest Group on Computers and Society is "a sample of tokenism," Edmund C. Berkeley said at the association's 25th anniversary dinner here.

Eight Years Ago
Aug. 27, 1969

WASHINGTON, D.C. — The Court of Customs and Patent Appeals up-

held the original decision made in the case of Prater and Wei that computer programs can be patented. But the decision did not uphold the claim for a patent on the software itself. The case involved patent claims made by Charles D. Prater and James Wei of Mobil Oil for a system of reducing errors in spectrographic analysis. The patent was originally rejected by the Patent Office on grounds it was a "mental process" and inherently unpatentable.

BOSTON — Separate pricing was the leading topic at the Share meeting held here. The question of whether members of the IBM users group would be willing to continue telling IBM what they needed if IBM turned around and sold the answers back was hotly debated. The undercurrent seemed to be in favor of splitting Share away from IBM and making it an independent users group, but there seemed to be an equally strong current toward continuing Share activities without change.



Let's See — You'll Need a Copyright for Your Poetry-Writing Program, a Copyright for Each Poem It Generates, a Copyright for the Program That Prints the Copyright Notice for Each Poem...

Where Are the Operations Success Stories?

By Jack Stone
Special to CW

"And now will the real successful DP manager please stand up!"

This statement is not really intended to be a parody of a quote from a famous TV show. It is actually a serious request from this writer.

You see, I developed what I originally thought was a great idea for my next series of columns but, rather pathetically, it now appears doomed to failure. The concept of the sequence is that I visit a "successful" DP department and interview some of the people involved with the operation — a group consisting of, perhaps, a user manager, the senior non-DP executive, the DP manager, an operator, a systems programmer or whomever else might be interesting for the purposes intended.

The theory underlying the writing is, of course, that certain attributes of a successful installation may trigger ideas in the minds of readers that could help their own operations succeed.

My problem, ladies and gentlemen, is that I can't find a DP manager who is willing to stand up and claim a successful operation.

Now before you scoff and guffaw, let me talk more about the nature of my dilemma.

First, the categories of DP departments I've been looking at exclude those installations whose primary mission is not the processing of

typical commercial-type production jobs, such as those devoted solely to development, since they are atypical.

Also excluded are scientific or engineering-oriented centers, since their users are generally (but not always) knowledgeable about their own needs, machine capabilities and systems design.

I did not include operations which are considered "small," in that the cost, DP head count, machine size or related factors are not of earth-shaking consequence to the organization. And, obviously, special-purpose machine systems are not considered.

I'm just referring to the typical DP department which is a separate entity, has its own staff of programmer/analysts and has its own machine operation with an IBM 370/145-class machine or larger. It processes a mixed bag of test and production jobs in the multiprocessing environment, has a reasonable level of cost/performance consciousness and services a host of non-DP-experienced users.

Now let me turn to a discussion of performance success. I accept the classic technical goals of efficiency, effectiveness and economy. But I believe there is another set of classic goals that must be met if technical performance is to be achieved. These are human performance goals.

Peering beneath the mechanistic cloak of "productivity" goals, I am

referring to goals which pertain to human intellect, volition and affections. They include such notions as communications, motivation, loyalty, judgment, receptivity to change, energy, risk-taking, attitude, decision-making, analytical ability, leadership, integrity, pur-

The Human Connection

pose, desire for success and inspiration.

It may never make the textbooks, but I'll propose Jack Stone's Theorem on DP Management anyway. It states: "In general, the technical performance goals of the information systems function are achievable only when human performance goals are developed in humanistic terms and resources are applied toward their attainment."

I submit that my difficulty in finding a success center strongly suggests the validity of my theorem because of the well-known disinterest in humanistic values, but does not constitute irrefutable proof.

As further testimony, let me relate just a few of the recent experiences I have had that illustrate rather elementary, yet devastating, applications (or lack of application) of the theorem:

• On user relations: During a lecture I gave to over 100 DP profes-

sionals, I asked, "How many of you believe the user's guide for your computer center properly or reasonably reflects the range of services, operating procedures and special guidelines for use of the center facilities?" Three hands.

• On management development: I purchased three new entries for my library of DP management textbooks. All three authors stated that human communications and interpersonal relations were very important but beyond the scope of their respective texts.

• On programmer/analyst management: I met a person at NCC 77 who functions as a second-level programming/analyst manager and expressed interest in joining me for some writing projects. As we chatted, I concluded that I might finally have found my "successful" installation, though she revealed a great story of excellence in DP management. Sadly, though, I had to disqualify her installation as a candidate for my success story because it is heavily science-oriented. Much more distressing was that she could not refer me to any other prospect.

• On operations personnel: I received a frantic call from a prominent installation which was in the process of upgrading from a uniprocessor to a multiprocessor configuration. In spite of the untold number of dollars and man-hours involved in the conversion, it had neglected to plan for an effective

(Continued on Page 20)

Data Evacuation Can Save DP in Blackout

Blackouts like the one that hit New York City last month will hopefully never be so frequent that computer operators and analysts have to face them as daily occurrences. Because of their infrequency, they are treated as matters for contingency planning.

However, contingency plans often lack one important consideration — they take for granted that the world outside the computer room is operating normally. As the New York situation showed, however, there can be times when elevators don't run, the air conditioning stops and cars go only as far as their gas tanks will allow.

And yet, with increasing world complexity and increasing world shortages, it seems only prudent to see if DP operations can be safeguarded in an economic manner. This column suggests one possible method based upon the situation in New York, where the telephone communications systems continued running when the power went down.

The basic method is simply to evacuate the computer data via telephone and satellite to anywhere else in the world where pre-

planned, modified operations can continue to serve the area affected by the blackout. When the blackout is lifted, the process can be reversed.

The emergency mode in both the communications network and in the computer room would have to be initiated by some form of disaster signal. In the best form, such a signal could be an early warning signal, a sort of "Condition Yellow" sent out by the power company on a special network.

In other cases, when there is no time for a warning, the evacuation period could well have to be cut to five minutes, or even less.

The communications lines would have to verify the receipt and correctness of data at the remote site. This could not wait until the remote computer starts trying to operate on it; by then it might be too late to ask for part of a program to be retransmitted.

This appears to suggest the emergency communications network should be, at least in part, based upon packet switching so each packet of data being shot to safety would be checked for accuracy within a second of leaving the site and then maintained within the network in accurate form.

It would not appear to be necessary to send out all the data in the data center. The center would only have to send:

• Contingency alert instructions to

(Continued on Page 20)

Will Method Work?

This week's Taylor Report suggests a combination of power company and telephone company services could maintain essential DP operations by evacuating the data to a remote site during an emergency and then returning it later. Some of the essential points are listed here for your review.

1. Special telephone communications would carry warnings of power drops.

Would this work? Yes ☐ No ☐

Comment: _____

Alternative: _____

2. Special broadband equipment would be installed at the DP site to transmit files and programs during the contingency emergency.

Would this work? Yes ☐ No ☐

Comment: _____

Alternative: _____

3. The network would be a self-verifying one with data storage facilities and host computer connected to restart contingency programs, hopefully with switched phone numbers.

Would this work? Yes ☐ No ☐

Comment: _____

Alternative: _____

Name _____

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City/State/Zip _____

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The Taylor Report

By
Alan
Taylor
CDP

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By Donn B. Parker
Special to CW

As computers expand into sensitive functions in organizations throughout society, the need to assure safety from all kinds of dangers and losses in the use of computers becomes increasingly critical.

Concern over the threat of intentionally caused losses and abuses can be seen in recent articles in the Aug. 1 *Business Week* and Aug. 8 *Time* magazine, as well as in Sen. Abraham Ribicoff's Committee on Government Affairs in the U.S. Senate, which recently produced two reports on computer-related crime and is proposing criminal law on the subject [CW, July 4].

During the past seven years, I have had the unique privilege of working toward the goal of safe use of computers on a full-time basis as a consultant and researcher at SRI International, a not-for-profit research and problem-solving institute. SRI has strongly supported this work, and several private and federal clients, principally the National Science Foundation (NSF), have funded the efforts on a limited, often a no-fee or no-profit, basis.

Ethics and computer abuse are important subjects of this work at SRI. These two subjects are also of high interest in the public media.

Codes of Ethics

Codes of ethics have been of great benefit to society in other professions, including law, medicine, accounting and engineering. Critics of codes of ethics have an easy time of it. Their arguments are usually based on the

logic that the exceptions, no matter how few, prove the codes' ineffectiveness.

Such "proof" is not hard to find because, in any profession with a code, each wrongdoing violates that code.

Reader Commentary

and violations have great visibility.

On the other hand, little can be measured and very little is heard about the many positive results produced by codes of ethics. Through the good work of dedicated Association for Computing Machinery members, a code of ethics has been developed, and a procedure for invoking sanctions is now being seriously considered. The Data Processing Management Association and other professional societies are also making headway in this area of responsibility.

About two years ago I reached the conclusion that a code of ethics, even with sanctions, would have little vitality unless the people concerned with computers were alert and sensitive to the ethical aspects of situations which arise and which they encounter in the course of their work. What was needed was a widespread interest and discussion within the computer field about specific ethical issues and about what is ethical and what is unethical.

A modest NSF grant was awarded to carry out a project on ethics in computer science and technology. That project is using an experimental methodology to make personal ethical

issues amenable to explicit debate and opinion and ultimately to facilitate generalization in the expression of possible principles.

To accomplish this objective, 62 scenarios that raise ethical questions were presented for discussion at a national invitational workshop held in March. It was sponsored by American Federation of Information Processing Societies (AFIPS) and attended by people who were recommended by the presidents of the AFIPS constituent societies and persons known to have written on the subject of ethics. It included a range of people from the computer field, ethical philosophers and lawyers.

The final report on the project, to be published by the AFIPS Press, will consist primarily of the half-page scenarios, each followed by the votes of the participants on whether there were ethical violations, their opinions on the specific cases and a statement of any general principles that the scenarios might have suggested.

A recent article and request for reader response to two ethical scenarios in *Computerworld* [CW, March 21] indicate the great interest in and effectiveness of this scenarios technique. The reader responses were reported in the April 11 issue, and at that time over 350 respondents had submitted their opinions of the scenarios.

The importance of developing sensitivity, awareness, interest and dedication to ethics in the computer field can easily be seen from the results of the study of computer abuse that has been going on for several years. It is funded primarily by grants from NSF at a two-person level of effort.

The study does not deal exclusively with fraud, theft, larceny, embezzlement, sabotage, espionage or extortion. It deals with all kinds of intentionally caused losses and abuses where they can be historically studied to produce information of value in helping potential victims protect themselves from similar experiences.

The file of reported cases represents a small, highly biased sample of loss experience; a number of the cases are reported only in the form of brief newspaper clippings. Many others are documented in great detail. The more valuable cases are being investigated in depth; more information is being collected.

The needs for a safe technology require our attention. We should all be supporting the endeavors to meet those needs.

Parker is senior management systems consultant at SRI International in Menlo Park, Calif.

Evacuation Saves DP

(Continued from Page 19)

terms.

- Minimum response, store and return programs to the emergency center.

Emergency response files to the emergency center.

Preferably, the communications lines to the original data center would be switched to the emergency center when it is established (and would be part of the communication operation). This is not too difficult using microcomputer systems for the switching operation — if the requirement has once been programmed in.

Naturally, all of this has to be financed somehow. There appear to be two means of financing it — one through private enterprise, the second through state control functions.

In the private enterprise operation, the telephone companies and perhaps the power company would offer it as a service; certain charges for equipment maintenance would be made when no blackout occurs and appropriate fees charged for services during blackouts.

The problem with this idea, however, is that communications companies and power companies are basically noncompetitive, so there is little incentive for them to offer such a service.

Under the state control functions,

the provision of such computer evacuation and restart facilities would be mandated as a requirement of any communications facility in computer times.

So that is one system I see for averting big or little dangers to computerized operations from power failures. Doubtless there are errors here; perhaps other ideas would be better and more economical.

Here is a questionnaire for your suggestions on how to save computer operations from potential power disasters. You can use it for reviewing my ideas, but hopefully you will also use it to suggest your own solutions.

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Success Stories Sought

(Continued from Page 19)

operator training program and its operations function was in a wretched mess.

So here's my appeal. If you believe your installation is a success story and your category is proper, and you wish to tell the computer world about it via my series, send a letter of justification to me in the Editorial Department, Computerworld, 797 Washington St., Newton, Mass. 02160.

Try to keep the letter to under 500 words and include an OK to use your and your firm's names plus an invitation from a person in authority for my interviews (to be conducted at my own expense). Each entry will receive a complete set of my CW articles.

I really don't think I'll get one qualifying candidate. I truly believe Stone's Theorem is a universal DP truth as yet undiscovered by the world of DP management.

But 'Teams Don't Just Happen'

Team Programming Urged for Reliability

By Esther Surden
CW Staff

DALLAS — It is presently possible to implement a software system that has not been reviewed by anyone beside the programmer and "this is causing a lot of difficulties," according to Donald C. Gause, president of Ethnotech, Inc.

To remedy this situation, Gause recommended team programming techniques, which he said can provide improvements in reliability on the order of three times that of traditional programming.

To implement a team approach, a firm should know the talents available for the project. "Most of us don't really know who we have working for us," Gause told a recent conference here. "We wrongly estimate our people and there is no good yardstick to measure productivity."

In some cases, a person inadequate for the job is appointed chief programmer; in others, a person more adequate than the chief programmer is appointed backup for the chief, he said.

'Self-Organizing' Concept

In order to combat these problems, Gause suggested that users adopt a "self-organizing team concept" if roles are given. An open team in which no roles are assigned, however, will "encourage open inspection of work by team members," he said. "Never let a problem become undefined," Gause urged. "Don't put effort into the management of unknown activities."

Many programmers don't know what is being built and there is no reliable measure of the percent of code that has been compiled. But something can be done about this situation if — before programming ever gets started — the team goes into the design phase with target dates, functional boundaries and formal reviews defined.

Using this procedure, the team can come closer to knowing what is to be done, he indicated.

"Teams don't just happen," Gause warned those thinking of trying the technique. Management has to invest in team building because a team that works well together can be productive and is in a good position to define its own difficulties, he said.

Users establishing a new team should try to create some experience-sharing opportunities on a social level to facilitate the rapport between members, he suggested. Successful teams should always be kept intact.

One problem faced by programmers trying a team approach is that management may not understand the concept. Management may see the team as not being on schedule for example, and try to add more people to the team.

This, however slows down the team because of the added burden of extra social interaction combined with heavier communications requirements, Gause stated.

Another problem is that sometimes one team member is burdened with too many roles, he said. Five members is the logical limitation of such an organization. This number allows diversity, but is small enough that the programmers will not splinter off into subgroups, he explained.

Adequate time also has to be allowed for

learning, Gause said. Many feel that learning can be separated from performing the task, but with this attitude "we are missing the golden opportunity to provide a learning experience within the project itself," he cautioned.

The team can do something about reducing the unknowns in the programming effort, for example, by keeping a log of unknowns "by asking what you really don't know about the project." A top-down design strategy can also help, he said.

Accounting Modules Offered For Distributors on BSP 'Syfa'

IRVINE, Calif. — The Business Systems Applications Programs (BSAP) package recently introduced by Business Systems Products, Inc. (BSP) for use with its Advisor small business system is said to consist of nine fully integrated accounting modules for distributors.

The Advisor "really is the Computer Automation, Inc. Syfa system, with a different label," a BSP spokesman said.

The modules currently available under BSAP include basic file maintenance support, one- and two-step billing, order processing and credit/debit memo processing, he said.

Accounts receivable, inventory control, purchase order processing, sales analysis and end-of-day processing are also part of the package, he added.

The interactive on-line nature of the software sets it apart from the modules offered

by some of BSP's competitors, the spokesman contended. He pointed to order point and credit limit warnings, issued as soon as a problem is sensed, as examples of BSAP's capabilities.

Each of the BSAP modules support all subsets and can be integrated with the other modules. The package can also be enhanced to complete the financial portions of manufacturing as well as other applications, the spokesman said.

The software, developed by Software Concepts, Inc. also of Irvine, and the Advisor hardware is suitable for small and medium-sized businesses with 10 to 500 employees and annual sales ranging from \$500,000 to \$50 million, BSP said.

The BSAP package is available for about \$5,000, including 150 hours of training, the company said from 2121 Campus Drive, Irvine, Calif. 92715.

IBM Links Update 'Quikjob III'

DAYTON, Ohio — A variety of enhancements and a superseded version of Quikjob III, a report writer system, are now available from System Support Software, Inc. (SSS).

The updates include optional interfaces with IBM's IMS and DL/I data base systems and full-function Vsam support for Quikjob work, the vendor said.

Meanwhile, Quikwrite, an information retrieval, processing and reporting system, now supports both Quikjob coding and a CALL facility to IMS, Cincom System's Total, Software AG's Adabas and other data base management systems, according to a spokesman.

The DOS-oriented QuikDLI interface was introduced earlier this year. The OS-based QuikIMS will be available Sept. 1. Either of these interfaces can be leased for \$35/mo.

The Vsam support was made available to DOS users in March and April. Distribution of this facility will be made to OS-oriented Quikjob users this month and next. There is no extra charge for Quik/Vsam.

Report formats under Quikwrite are typically "autogenerated," but can be controlled by the user, he said. The system produces Quikjob III source code which can be stored and, if desired, refined to accomplish tasks not within the scope of a typical generalized report writer, he claimed.

The DOS version of Quikwrite is presently available, the OS version is expected to be available about Nov. 1. Current Quikjob III rental customers can acquire Quikwrite for \$197/mo on a lease/purchase plan, the spokesman said from 5230 Springfield Pike, Dayton, Ohio 45439.

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College's Data Base Aids Gas, Oil Field Studies

By Esther Surden
CW Staff

DALLAS — With energy a national concern, the University of Oklahoma has developed a data base of petroleum-related information that is available to users over the General Electric time-sharing network, according to Patricia A. Tracy of the university.

The Petroleum Data System (PDS) consists of information on over 75,000 gas and oil fields in the U.S. and Canada.

Sources for the information include annual state reports, the International Oil Scouts Association and state geologists. In addition, information from the Federal Energy Administration, Federal Power Commission, Energy Research and Development Administration and the Bureau of the Mines is included in the data base.

The identification of a particular field by name and reservoir, location as well as production data and geologic information such as age of the formation is handled by the system, Tracy said here recently.

The system is used for exploration

project evaluation studies, property evaluation studies, pipeline research and feasibility studies, she noted. "Oil companies use the data base to get the information necessary to complete government questionnaires," she added.

The university chose to use existing software systems to quickly implement the network-based data base. "The use of existing software has freed the university of many problems in program design and implementation," and also helped reduce im-

plementation costs, she said.

"Using developed software has been a distinct advantage for us," she continued.

The packages chosen include a "sophisticated storage and retrieval system called Gipsy General Information Processing System developed at the University of Oklahoma. Gipsy is used on either an IBM 360 or 370 series and operates under OS. "It is an excellent system for management of large data bases," Tracy told the group.

The system is very flexible, she noted, and since the PDS must be continually updated, flexibility is key.

The school is also frequently restructuring files, she added.

For example, "we are currently adding the latitude and longitude of the centerpoints of the fields to the records in PDS," she said. All that has to be done is to add a new definition to the data dictionary, so no special reprogramming is necessary, Tracy noted.

Gipsy has its own retrieval language that Tracy called a "user-oriented retrieval method."

Prior to the PDS being put on the GE network, the university tried to implement the system on its own in-house system. This was "somewhat of a farce because it didn't take much response from the industry to overwhelm the system," she related.

Now PDS resides on the GE remote-batch system. The university has developed an interface or foreground driver to allow simpler use of the system by those with wide varieties of expertise. Users range from geologists and engineers to secretaries and librarians, she said.

PDS is being used by 90 petroleum companies and several businesses and government agencies for a total of about 600 people on the system, she concluded.

Early Evaluation of Tools Seen Key to Software Plans

DALLAS — Early identification of an appropriate and complementary set of software engineering and project management procedures, controls and technologies is essential to good software project planning, according to speakers here recently.

Leon G. Stucki, systems development program manager at Boeing Computer Services, said the most important consideration when choosing a tool to improve productivity is payoff.

The organization should choose the system that has the biggest return on investment, Stucki told a group largely composed of project managers.

Users should remember they can not expect tools to be "commissioned today and up and running tomorrow. Early consideration of tools is very important," he said.

The organization should also "place tools in their proper perspective." There are "some elegant tools that are either too costly or require too much manual work to set them up," he cautioned.

Tools are also not free. "They do consume resources," and setting up the tools can be costly, demanding more resources than it is worth, he said.

The manager should "view the system in total perspective but, when planning, view it as a series of baselines and phases," according to Ray Caudill, team leader in the Air Force Data Automation Agency.

The development process is a continuum, he said, but it can only be handled when broken into pieces. "Why do software development efforts fail?" he asked. "Because we have not broken life cycles down into manageable, understandable entities."

Project Review

Review is another method of making sure projects succeed, Caudill said. "I've heard people say reviews are not worthwhile — that they are difficult to handle and manage. But from my point of view, the review is very important," he said.

At formal review time, users and DP people have a chance to change the project. This forces the users to think through the problem and also commits the DP people to say we know enough to go on to the next phase," he stated.

"Programming is unique in that it is one of the few tasks in which it's possible to work continuously but progress backwards," according to H. Sam Woodgate, manager of the public service section of Datakil, a large Brit-

ish software house.

The firm is managing from 50 to 60 different jobs using system-generated data. The computer output is used as a management tool to help in planning, he indicated.

According to R. Dean Hartwick, manager of information systems operations at Logicon, Inc., the cost of doing a legitimate test effort is about 45% of the total cost. "Clearly test planning is a crucial part of the operation," he said.

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Data Base Move Requires The Right Types of People

By Stephen Robinson
Special to CW

I have received several interesting responses to "Move to Data Base Requires Changes in Philosophy" (CW, June 6). The tone of many of the letters was the same: "We know our systems are not making full use of hardware and software capabilities. What do we do about it?"

Some of the issues the letters raised are not directly related to data base details, but they are important. Like a careful consultant, I will not claim to have all the answers. I do, however, know some of the questions such as:

• **Planners or caretakers?** Somewhere in your organization is an individual or group of individuals who have primary responsibility for recommending upgrades/modifications/discards of hardware.

Usually this group prepares a financial and technical recommendation for the ultimate decision makers, who control the purse strings.

Let's look at this group. Do they know what a microcomputer chip is? Would they recognize a microcomputer chip if someone slipped one in their lunchbox? Or do they simply upgrade whatever computer line was present when they joined the company?

Put another way, is your computer center being looked after by kindly caretakers who wouldn't rock the boat or by people who would rock it? Or is it being managed by tough individuals supported by technical staff who know what is going on in the hardware area?

If you are in the former category, consider a transition to the latter. How you effect such a transition is clearly a function of your organization's structure and politics. A future column will contain a disguised case history of how one company managed the transition.

• **Business or computer analysts?** When your prospective "clients" talk to someone about their data and information requirements, do they talk to a business-oriented or a computer-oriented individual?

A client should first be able to talk with a business analyst who understands the environment that is creating the information requirement. The business analyst may be able to make significant contributions to the user's original concept of information requirements.

Once they have conceptualized the information requirements, the business analyst and the user get together with a computer analyst to discuss the proposed system and see how it can be implemented.

The computer analyst must personally be familiar with the state of the art in hardware and software or go to the meeting with technicians from the data center who have such knowledge.

Far too many systems are bungled at this stage. The computer analyst typically is constrained (actually, or in his own mind), by the existing hardware and software. Innovation goes out the window.

An application best done on a dedicated mini gets shoehorned into the

existing maxi, where its low priority and resultant poor response destroys the value of the system. Alternatively, a system that would be a natural for a special-purpose programming language ends up being done in Cobol, which results in the commitment of 200% more programming, debugging and maintenance resources.

So there is a need for two different types of analysts. Make sure your computer analysts really understand the world of DP or move them out of that very responsible position. And don't promote someone into that job just because he is a good programmer, programming supervisor or program analyst.

• **Is management calling?** It is evident the biggest problem is people. Find people with the required expertise, interest in their professions, curiosity in new developments and pride in doing a good job. The responsibility for finding, and motivating such people must lie with management.

Hiring should not be based solely on how many years of Cobol programming a person has on his resume or what courses he took at college. Several years ago, when I was doing college recruiting for Applied Data Research (ADR), I would look for enthusiasm first. Was the interviewee putting himself, as well as me, to sleep with a description of recent programming projects?

Secondly, I would look for interest. At ADR we had an interactive programming language called ESI for the Digital Equipment Corp. PDP-8. The instructions were one page long. We gave a simple programming assignment and went away.

After an hour or so we checked back with the interviewee. We were interested not only in the solution to the problem, but how many features the interviewee used and/or played with.

Similar screening techniques—perhaps with different focuses—are, I suspect, widespread even if unpublicized. Personally, I'd welcome letters describing the way readers evaluate applicants beyond checking resumes. I'd be glad to share your thoughts in another column.

The other side of hiring, of course, is firing. The small number of people dismissed for incompetence is not nearly reflective of the sad state of DP activity throughout the country.

At a recent meeting of over 100 DP managers, I asked how many had fired people for incompetence within the last year. Two hands were raised.

I then remarked that everyone else must be really lucky to have excellent staffs who developed systems on time and within budget that were well documented and easily modifiable. The resultant laughter died down only when people realized they had nothing to laugh about.

The systems gap can only be bridged by people. Data base system development must be accompanied by the development and acquisition of competent business and computer analysts.

The onus is on management to recognize the importance of the requisite expertise and to acquire it.

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Architecture Based on X.25

NCR Unveils Distributed Network Plan

By John P. Hebert
CW Staff

DAYTON, Ohio — NCR Corp. has unveiled a standard interface, packet-switched communications network architecture for distributed processing.

It was designed to consolidate and unify telecommunications architecture and protocols for all present and future NCR product lines, the company said.

The NCR Distributed Network Architecture (NCR/DNA) will be based on the CCITT X.25 protocol recommendation. It was described by Robert Galin, NCR's director of communications systems, as both an evolutionary outgrowth of existing NCR communications approaches and the addition of totally new concepts and equipment.

NCR/DNA will initially surface in products the company is

planning to introduce late this year; the conversion of existing products to the unified approach should be completed in 1979, according to Galin.

The DNA approach allows any terminal in the remotely dispersed or in-house DNA network to access any user-authorized CPU and have data processed on it or to access any other authorized terminal in a network, Galin said.

It also separates communications processing tasks from applications processing, according to NCR.

The applications programmer is therefore insulated from the procedural aspects of communications, simplifying software and support for both realms, the company claimed.

Rather than centralizing control in a single host processor, DNA

distributes control throughout the network, making it less vulnerable when a single network element malfunctions, NCR continued.

The DNA approach also makes possible the reconfiguration of networks to meet changing user needs without shutting down the network, it added.

Three Main Elements

The three main elements of the distributed architecture are Data Link Control (DLC), the Telecommunications Access Method (TAM) and the Data Transporting Network (DTN).

NCR/DLC, based on the X.25 standard, is a bit-oriented protocol for telecommunications within DNA systems. All new NCR products will provide this protocol through added software modules called entry/exit service

modules.

These modules will recover message header formats into the DNA network format and establish an end-to-end format, according to Galin.

NCR/DLC is similar to the American National Standards Institute's Advanced Data Communications Control Procedure (ADCCP) and the International Organization for Standardization's Higher Level Data Link Control (HDLC) protocols, NCR said.

As such, DNA will provide the means for establishing communications links from public data networks such as Datapac in Canada and Transpac in France, which are also based on X.25, NCR noted.

Networks operating under the DNA scheme will also provide users with a compatibility for non-NCR equipment that conforms to these protocols, as well as compatibility with equipment operating in IBM Synchronous Data Link Control (SDLC), the company added.

NCR will make a commitment to be compatible, "but not necessarily" with IBM's System Network Architecture (SNA), Galin explained. "NCR plans to provide interfaces to appropriate non-NCR equipment, including host computers and terminals," he said.

NCR/DLC is described as operating on a message level, rather than a character level. It reportedly allows full-duplex operation between equipment in the DNA network and provides a high degree of error control.

In addition, DLC is the basis for a proprietary, high-speed (48 kbit/sec) modemless in-house communications technique "to which all future NCR systems will evolve," the company said.

NCR/DTN is a set of node processors and internal links. It is the store-and-forward packet-switching system that serves user applications by making information transparently, NCR explained.

These processes reside in terminals and communications processors connected to the (Continued on Page 27)

With Hardware, Software

Raytheon PTS-100 Emulates SDLC

NORWOOD, Mass. — Raytheon Data Systems Corp. has enhanced its PTS-100 series of programmable terminal systems to support communications under IBM's Synchronous Data Link Control (SDLC) protocol.

The enhancement permits PTS-100 systems to perform the functions of remote IBM 3270 equipment communicating with a host mainframe under SDLC, the company stated.

Central to the PTS-100 SDLC enhancement is a communications adapter built around an 8-bit microprocessor according to a spokesman. The communications adapter provides an interface between PTS-100 control units and modems with speeds ranging from 2,000- to 9,600 bit/sec, he said.

The software required to support SDLC communications from PTS-100 configurations resides in 4K words of MOS memory on the communications adapter board. As a result, the adapter can be reprogrammed as requirements change, Raytheon noted.

The adapter plugs into a low-

speed multiplexer port in the terminal control unit, permitting currently installed PTS-100 systems to upgrade to SDLC capability.

System upgrades require only a tape cassette containing remote 3271 SDLC emulator software and the SDLC communications adapter, which replaces the existing BSC modem adapter.

There is no charge for the SDLC emulation software on new PTS-100 systems, Raytheon stated.

The cost of the SDLC communications adapter, required to upgrade existing installations, is \$1,000.

Raytheon is at 1415 Boston-Providence Tpk., Norwood, Mass. 02062.

Group Releases Glossary

OTTAWA — Outside the world of computers and telecommunications, a "duplex" is a place to live and a "stuffed character" is a basketball star.

But in the communications field, a stuffed character is "a character used on multiplexed synchronous transmission links to take into account the differences in clock frequencies," according to a comprehensive glossary of communications terminology released recently by The Computer Communications Group

of the Trans Canada Telephone System here.

Three years in the making, the glossary covers many of the new terms and acronyms that have evolved with the expanding field of computer communications, the group said.

The 32-page booklet defines commonly used terms at a semitechnical level.

It is available in English or French, costs \$1 and can be obtained from the group at 12-160 Elgin St., Ottawa, Ont. K1G 3J4, Canada.

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Lear Siegler CRT Works In Burroughs Environment

ANAHEIM, Calif. — Lear Siegler, Inc. has introduced a dual-mode interactive CRT terminal said to be compatible with Burroughs Corp. CPUs and equipped for the Burroughs network polling environment.

The ADM-2B is switch-selectable for operation in two different modes. In one mode, the terminal functions as a standard ADM-2; in the other, it is a Burroughs Series TD800-compatible polling unit, a spokesman explained.

In the TD800 mode, the terminal reportedly adheres to standard Burroughs poll and address line protocols; has a forms mode for field protection; and offers text-editing features.

Switch-selectable line diagnostics for

troubleshooting the data communications network and eight status displays set to provide the operator with error and status information are other features offered by the terminal, the spokesman noted.

In addition, the ADM-2B will

Terminal Transactions

operate on the same lines with Burroughs TD800 and TD820 terminals, according to Lear Siegler.

Standard text-editing functions of the ADM-2B in both modes include erase to end of line/field/page; insert and delete character or line; blinking or blanking fields; cursor control; and addressing.

The terminal also features scrolling, tab set/reset, limited polling and full- and half-duplex transmission at 110- to 9,600 bit/sec, the spokesman added.

The terminal's CRT displays 24 lines of data at a density per line of 80.5 by 9 dot-matrix characters in a 7 by 11 dot-matrix field, he said.

The ADM-2B costs \$2,485. An optional RS-232 interface costs an additional \$50 from Lear Siegler at 714 N. Brookhurst St., Anaheim, Calif. 92803.

ISC 8001 Gets Arabic and Farsi

NORCROSS, Ga. — Intelligent Systems Corp. (ISC) has developed a keyboard operating system in Arabic, Farsi and a number of other languages for its Intecolor 8001 eight-color alphanumeric/graphic terminal.

The operating system is said to change the shape of letters depending on their position in a word, allowing the operator to enter letters without regard to character forms.

In addition, when numerals or English alphabet characters are entered, they are automatically justified left so they can be read left to right, the company said.

The keyboard operating system increases the cost of an 8001 from about \$2,400 to about \$4,400. If a user wants ASCII characters for the terminal, it will "cost more than \$5,000," while the Basic language compatibility costs less than \$1,000, depending on the additional memory necessary, the spokesman said.

ISC is located at 5965 Peachtree Corners East, Norcross, Ga. 30071.

Series 100 Certified

COLUMBUS, Ohio — The M/I Corp. Series 100 TWX/DDD modem has been granted certification from the Federal Communications Commission in the Part of long-form registration procedure.

The registration allows users to connect the equipment to the switched telephone network; M/I has already produced and is presently shipping Series 100 modems.

M/I is at 1212 Kinnear Road, Columbus, Ohio 43212.

OCR SAVES MONEY

How Erie County, NY saves over \$300,000 a year with OCR

It's a fact that most county government data processing departments have very tight budgets... and Erie County, NY is no exception. Gerald E. Wilson, Erie County's director of data processing recognizes that up to 30% of the

cost of the average county government computer installation is in data entry. He initiated their use of OCR to cut those costs.

After careful evaluation they selected the Laser OCR-One optical character recognition system. Just one example of how Erie County cuts their data entry costs with the Laser OCR-One is their county nurses reporting system. This innovative new system alone saves at least \$5,280 a week! An added bonus is more meaningful management reporting.

Despite a 15% staff reduction in their data

processing department, Erie County has achieved a 16% increase in efficiency in 1975 and an additional 10% in 1976. Jerry Wilson says, "We really couldn't have gotten by without scanning and our Laser OCR-One."

For information on how you can cut data entry costs, contact

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Bank Verifying Client Signatures on CRTs

DALLAS — A small bank has reportedly become the first in the country to add a new wrinkle to banking — verification of customer signatures displayed on terminals located at teller stations.

Aside from the novelty of the approach to signature verification, the terminals perform a range of other functions and have saved Commonwealth National Bank enough money to justify the cost of five drive-in teller stations, according to Omar Dennis, the bank's senior vice-president and cashier.

Since early this year, Commonwealth National has been using the Signature Verification terminals supplied by Signature Technology, Inc. and made by Informer, Inc. to shorten waiting lines inside the bank and at drive-in windows.

Waiting time, especially at the drive-in teller stations, has been cut in half; the terminals also have helped to deter forgers, improve teller efficiency and productivity and preserve the goodwill of customers, Dennis said.

The terminals are tied to a Honeywell Information Systems, Inc. 2058 host CPU

located 10 miles away at Affiliated Computer Systems, the bank's service bureau at 2,400 bit/sec over AT&T private lines.

Captured by Camera

Tellers can display information on customers' checking, savings and loan accounts as well as call up a digital display of the authorized signature for that account, Dennis said.

Signatures are captured at the same time a new account is established by a separate desktop, camera-equipped capture unit and stored in digitized form in the service bureau computer.

To capture a signature, a clerk positions the specimen on the capture unit, then depresses a capture key on the keyboard. If the display appearing on the terminal is satisfactory, the clerk then depresses the SEND key to transmit the signature to the computer for storage.

Commonwealth National, which processes an average of 17,000 checks daily, now has 15 Informer Model 301 Signature terminals — one at each of five drive-in stations, four shared by 10 internal tellers, plus one each in bookkeeping, general ledger, new accounts,

credit inquiry/customer service and the loan department. Operations and administrative officers have executive inquiry models to inspect any of the bank's 21,000 accounts.

'Customers Fascinated'

"Our customers have been fascinated," Dennis said. "They say they feel a little more secure against someone forging a check on their account, but the real benefit is good will anytime the customer comes to the bank."

"This is especially true at the drive-in stations. The teller doesn't have to ask for further identification or interrogate the customer," he said.

"Previously, we used the direct card system for signature verification," Dennis recalled. "Tellers inside the bank had to walk over to a central file and look up the customer's card. In the drive-in stations, tellers had to phone inside the bank. If there was any question, they had to send the customer inside."

"Bank employees love it, too," he added. "With the old card system, they had to leave their cage and leave their customer waiting while they verified a signature or looked up a balance."

"Now, they either have a terminal right next to them, or some may have to cross over four or five feet to a shared terminal."

The Signature terminal's small size and relatively inexpensive cost has prompted Commonwealth to install CRTs without the signature feature in other departments of the bank, such as the loan department. The terminal has a full keyboard with a pedestal-mounted 6-in. CRT.

Commonwealth National chose the Informer Signature terminal after carefully evaluating microfilm and closed-circuit TV, according to Dennis.

"We were looking for something that was compact. Microfilm has to be updated, changed and added to

periodically. With closed-circuit TV, we would have needed an extra person just to man the station," he noted.

"In comparison, we felt that with the amount of money we would have had to invest in microfilm or TV plus the extra people to operate them, the amount of investment in the Signature system, we are financially better off with the 15 Signature units."

"What we saved by going with the Signature terminal system has justified the cost on five drive-in teller stations alone," Dennis said. "The Signature terminal is basically just a different type of CRT that happens to be lighter in weight, less bulky and takes up less space in the teller's cage where space is at a premium."

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NCR Unveils Net Scheme

(Continued from Page 25)

network and address each other by English language names, without regard to physical location.

"Each processor node — whether it be a separate piece of hardware or software 'buried' in a small CPU in the network — will have user-programmable conversion tables, Galin said.

The conversion tables will convert the English address consisting of a 12-byte field to a physical location address of 15 to 23 bits and then transmit to the next node. Each node will in turn determine whether the information packet is for it or for another node further down the line, Galin explained.

NCR/TAM functions as a boundary between applications object programs and the telecommunications devices, the company stated.

Other functions of the access method include system and link control, queue management, resource scheduling, addition/deletion of packet headers, error recovery and retransmission and operational diagnostics, it said.

NCR/TAM will have no relation to IBM's Telecommunications Access Method (Tcam) except for the operating system and access methods. There will be no compatibility with IBM's version, Galin claimed.

The DNA network was designed to use dedicated lines presently provided by communications common carriers, although NCR will offer users the option of employing dial-up lines as backup, according to Galin.

NCR will announce the first telecommunications processor designed under DNA guidelines, the NCR 721, next month. The first DNA terminal will be introduced by the end of the year, and there will be a string of products announcements in the first half of 1978.

'Pushes More Data'

The DNA protocol scheme, like its international counterparts, makes more efficient use of communications lines — "pushes more data through the same size pipe" — because of the elimination of conversion overhead and the use of simultaneous, two-way communications, Galin remarked.

If present users want the capabilities of the distributed architecture, they will have to weigh the cost of conversion against the operating cost benefits of such a system, he added, indicating the cost of conversion could be very high. "There will be restrictions both on the number of CPUs in a network, as well as how many can communicate simultaneously, Galin admitted, adding those limits will be divulged in the first half of next year.

BID OPENING: NEW MEXICO STATE UNIVERSITY OFFERS FOR SALE TO THE HIGHEST BIDDER 18 SANDERS MODEL 622 CRT TERMINALS; AND OTHER SANDERS EQUIPMENT.

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Bid specifications and information, request (BID Form 1000), contact Director of Purchasing, Box 3890, University (505) 444-2916. New Mexico State University, Las Cruces, N.M. 88003.

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To Lease or to Purchase?

User Changes Upgrade Query Approach

DENVER — Data Power, Inc. has upgraded its DP capabilities four times in the past four years. But when the service bureau made its latest change last December, it decided to buy its own mainframe instead of continuing to lease.

"Our growth has stabilized at about 10% a year and, at that rate, we feel our system will serve our needs for at least another eight years, and perhaps more," Russ Lowery, Data Power president, explained. That stability in growth is what made Data Power confident enough to purchase instead of lease, he said.

"With so much power and the built-in provision for expansion, the obvious economies of outright purchase over leasing became paramount. This was especially true because of the equity we had built up in peripherals such as our disk drives," Lowery noted.

"Furthermore, since we had been an NCR user since the day we replaced our punched card equipment with a disk-oriented computer, there was no conversion problem," he added.

The company which is now Data Power had its genesis as the DP department of



This card reader was the only peripheral Data Power bought when it made its latest upgrade.

Cummins Power, Inc., the diesel engine distributor. Cummins' first NCR computer was a 16K Century 100, which was installed in 1969. That was replaced with a 32K Century 200 when Data Power was established as a separate entity in 1973.

A year later, co-ownership in the service bureau was acquired by Colorado Kenworth, Inc., and Data Power added a 32K-byte Century 101.

The additional processing capacity was needed because Colorado Kenworth sells and services over-the-road tractor rigs and generates about 5,000 invoices a month.

Steady growth in the demand for DP led to Data Power's decision in early 1976 to replace its Century 200 and 101 systems with a 128K Century 151. A major benefit was the system's multiprogramming capability. Lowery noted: three programs could be run simultaneously instead of the previous two.

The need for enhanced flexibility became urgent as the service bureau expanded its roster of customers. Data Power saw its Century 151 would not be adequate in part because the two owners were becoming interested in on-line access to their data bases.

So instead of expanding the Century 151 CPU to its maximum of 256K bytes, the service bureau bought a 256K-byte Criterion 8550.

The price was nearly the same as the cost to boost the CPU of the 151, Lowery said, and there were several advantages. Among them is the fact that the Criterion CPU can be expanded to 1M byte in increments of 64K and the fact that the internal memory is twice as fast as that of the 151, he pointed out.

"With respect to the speed," Lowery said, "the critical consideration is that there will be no degradation of response time with on-line processing. In addition, whenever it may become desirable, the internal speed of the Criterion can be nearly doubled with an adjustment which takes only 10 minutes or so to perform on-site."

"Another advantage with the Criterion is its virtual memory, which permits data to be moved back and forth between the CPU and disk storage at high speed, enabling us to run more jobs simultaneously."

Series of Micros

The central processor of the Criterion is actually a series of microprocessors which are linked by a transfer bus like those found in many minicomputers. Through the use of floppy disk firmware, the CPU can emulate virtually any other computer, a CDC spokesman explained. It can therefore run Data Power's Century programs with no conversion required, or it can function as a Cobol virtual machine and can compile Fortran, RPG and Basic, he said.

The only peripheral added to Data Power's Criterion system, aside from the CRT operating console and its thermal printing I/O writer, was a 600 card/min reader.

The company retained its 1,200 line/min printer, its 800- and 1,600 bit/in. tape drive

(Continued on Page 30)

Planning Can Minimize Effect Of All Types of Catastrophes

By Jack S. Barritt

Special to CW

As firms become increasingly dependent upon having DP capabilities, there are two important questions that management must ask itself.

The first is, "What are the short- and long-term effects on operations if our existing DP capabilities are lost?"

Secondly, management must ask, "What can we do beforehand to reduce the overall impact of such a loss?"

The answer to the first question needs to be thorough and detailed. Each plant department or organizational unit that uses the computers should be required to outline what effect, if any, there would be on its operations if the computers become unavailable without prior notice for one day, one week or one month.

Also, they must determine what substitutes, if any, can be employed during these times and what would be required in terms of manpower, equipment and facilities.

As these replies are analyzed, it should become apparent how heavily computer activity impacts the overall operations of a firm. The analysis will also determine the time frame in which recovery must be made if serious disruptions are to be avoided.

A critical condition will exist when the effects are obviously immediate, serious and with no economically practical substitutes.

Serious fires in early computer installations focused attention on the need for specialized protection for the valuable and highly sensitive occupancy. After initial action by some of the larger insurance organizations, the National Fire Protection Association (NFPA), formed a special technical group in January 1960 known as the Committee on Electronic Computer Systems.

In 1962 the first edition of the Standard for the Protection of Electronic Computer/Equipment—NFPA No. 75—was adopted. Revisions were subsequently adopted in 1963, 1964, 1968, 1975 and 1976.

As a result, combustible construction is

usually avoided and the computer facility is isolated from exposing occupancies. Smoke detectors are installed for early warning of impending trouble. Automatic sprinklers and/or Halon 1301 total-flooding systems are provided for fires that cannot be quickly controlled by or exceed the capability of portable extinguishers.

But natural or man-made disasters still occur and will continue to do so, although hopefully at a reduced frequency. For example:

- In New York, as a result of storm Agnes, a corporate computer facility serving a number of outside plant locations was destroyed by flood at the same time that the main telephone cable for the community was lost.
- In Georgia, a tornado knocked out the computer facility for a large manufacturing and warehousing complex.

- A \$700,000 insured loss occurred in California when a high-pressure water main ruptured beneath a one-story building housing the computer system controlling the receiving, sales and warehousing operations of a large distribution firm.

- In Massachusetts, a fire that originated two floors below a computer center spread vertically through a cable shaft and virtually

(Continued on Page 30)

Seminar on Management Set

DELTRAN, N.J. — Datapro Research Corp. is offering "Effective Computer Operations Management," a DP technology seminar for managers, supervisors and key computer center personnel.

The three-day seminar will be held in Chicago on Oct. 12-14 and Dec. 7-9, in New York on Oct. 3-5 and Nov. 2-4, in Philadelphia on Oct. 24-26 and in San Francisco on Sept. 12-14 and Dec. 12-14. It will also be held in Washington, D.C. on Sept. 19-21 and Nov. 9-11.

The seminar is designed to discuss the controls, techniques and procedures of effective computer operations management, offering discussion in implementation, problems, successes and failures, a spokesman noted.

The seminar costs \$425 for current Datapro subscribers and \$475 for non-subscribers. A brochure with the complete course outline is available from Datapro at 1805 Underwood Blvd., Delran, N.J. 08075.

Preplanning Minimizes Impact of Disasters

(Continued from Page 29)

destroyed the center through the actions of heat, soot and corrosive gases.

- A number of militant groups across the country have used gasoline fire bombs or explosives to damage targeted computer facilities.

The most straightforward means for reducing any unacceptable impact is duplication at another site. However, complete duplication is normally not feasible because of the capital investment and operating overhead required. Nevertheless, a significant reduction in overall dependency may be achieved by putting minicomputers at the point of use and terminating or restricting the use of the main computers for less complex or secondary programs.

Another and more commonly used alternative is the use of some other facility on an emergency basis. The success of this approach depends upon a number of factors:

- The requirement that the operations be batch-typed and not real-time (i.e., dependent upon an external telecommunications network).
- The proving by actual use that the substitute computer system's capability and configuration are compatible with existing programs.
- The existence of a firm, written agreement detailing the minimum amount of computer time available in

an emergency, how soon it is available after initial request and for how long a time span.

- The prior establishment of priorities for handling various programs on a potentially restricted computer time base.

The final solution involves recreation of the facility at the same or a substitute site. This approach is often dictated for on-line or real-time applications that receive and transmit data over external telecommunication connections.

Computers servicing multiple locations, such as for airline reservations or for directly controlling processes as in a chemical plant or paper mill, are examples of such applications. Success in this approach hinges upon:

- Availability of needed computer equipment on short notice.
- Availability of office space that can readily be converted for controlled computer environment.

- Efficiency in reestablishing telecommunications circuits.

- The ability to update data bases from the time of initial interruption.

Examples can be found where there have been miraculous recoveries as the result of herculean efforts on the part of many people, including the user and the equipment manufacturer. The key in most cases was a degree of disaster preplanning coupled with well-defined levels of authority.

This combination lends itself to efficient use of resources, coordinated efforts and timely decisions.

Accordingly, along with prevention, protection, prediction and preplanning, the final "P" in the successful disaster recovery effort has to be people.

Key personnel must be selected beforehand and given clearly defined assignments of responsibility along with commensurate authority. The best laid plans are all for naught until someone takes charge and motivates, inspires, coordinates and directs other people.

So, plan well — but make sure that the plans will be activated and followed in the manner intended by choosing your disaster team just as wisely.

Barritt is the chief research engineer for Industrial Risk Insurers of Hartford, Conn.

User Switches Upgrade Method

(Continued from Page 29)

and its six dual-density disk drawers, each capable of putting 48 million characters of information on-line.

"We could have gone to the 100 million character disk units," Lowery noted, "but we had a substantial lease equity in the old ones," and we need the six separate drawers to run different customer jobs simultaneously."

Each of the company's principal owners, Cummins and Colorado Kenworth, has three CRT terminals in its headquarters. This number will probably increase to 20 at each company when their branches are linked on-line to the Denver DP center, Lowery said.

With this step, he continued, all invoice billing and repair order processing will be input through the CRT keyboards. This data is now being keypunched in batch mode from time cards and handwritten records.

The service departments of the two major users receive a preinvoice audit which details the charges for parts and labor on each job.

"This is important because it permits them to review the proposed charges before customers see their bills," Lowery said. "When you have to operate in a warranty environment as such companies do today, you can avoid unnecessary customer complaints by making the appropriate bill adjustments ahead of time. In addition, of course, such a step helps ensure accuracy."

The rationale for the creation of Data Power, Lowery continued, was to provide Cummins Power with the expanded DP capacity it needed, yet amortize the cost for that among others who could use the computer center when it would otherwise be idle.

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For starters, we made the IGT-100 interactive. And truly intelligent. So it's fully capable of sharing the graphics workload with its host computer.

Then, we gave it a longer-lasting raster scan (TV) type display. To produce faster, brighter, flicker-free images. To give you sharper, black-and-white graphics.

And to totally eliminate time-consuming image redrawing.

By contrast, most graphics terminals in the field today (with storage tubes) are about as far from interactive and intelligent as you can get.

Dependent is more like it. Because, typically, every graphic image — and every graphic manipulation — has to be carefully calculated, then transmitted, by the host computer to the waiting graphics terminal.

This whole routine not only puts a tremendous burden on the host computer (which usually has other jobs to do) but routinely requires lots of special software.

With storage tube type terminals, even routine manipulations like panning, zooming, selective erasing and message changing aren't very fast. In fact, the terminal operator is required to wait — up to several minutes — for a previous image to be completely erased and the second image to be tediously redrawn.

You get the picture, all right. But you'll get it faster with the new CalComp IGT-100. Because the IGT-100 is the quickest solution to these traditional problems. And easily, one of the most affordable.

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Thanks to our built-in microprocessor, efficiency doesn't get lost in the shuffle.

A built-in microprocessor helps make the new IGT-100 one of the smartest graphics terminals you can buy. And one of the most efficient.

Coupled with 12K bytes of RAM memory, the IGT-100's microprocessor permits local storage, manipulation and completion of display functions.

While providing an addressable memory matrix of 1024 X 680 bit positions. And a viewable matrix of 416 X 312 positions.

A keyboard with a 64 character ASCII set and an asynchronous RS-232-C interface are also supported by the IGT-100's microprocessor. Full or half duplex modes are switch-selectable. Along with asynchronous communication transmission rates from 300 to 9600 baud.

Give your new IGT-100 the whole picture and you'll never redraw it again.

Unlike most other graphics terminals, the new IGT-100 can store and manipulate images on an totally local level.

That means once an image is transmitted, you've got complete, autonomous control. All planning, selective erasing and message changing is instantaneously handled by the IGT-100's built-in microprocessor.

Even write-thru's, grids and zooms (2x, 4x, 6x and 8x) are displayed on the screen within 1/10th of a second.

And all without tying up your host computer. Or waiting several minutes for the image to be redrawn on a storage tube.

In fact, working with its built-in microprocessor, the IGT-100's longer-lasting raster scan screen will beat a conventional storage tube every time. Delivering a faster, brighter image at a flicker-free rate of 60 frames per second.

And that's a mighty pretty picture — any way you look at it.

Reader/Punch Links to LA36

WELLESLEY HILLS, Mass. — The National Computer Communications Co. has introduced a paper tape reader/punch that reportedly interfaces with the Digital Equipment Corp. LA36 and LS-120 terminals.

It will also link to any other terminal that uses an RS-232 interface supporting standard automatic send/receive (ASR) requirements, a spokesman added.

The Mode 1050 reads and punches at 30 char./sec and can optionally convert Ascii to EIA code.

The unit costs \$2,295 from the firm at 171 Worcester St., Wellesley Hills, Mass. 02181.

For Varian 4000 Series

Interface Converts Vector Data to Raster

PALO ALTO, Calif. — Varian Graphics has a microprocessor controller interface that reportedly reduces the computing power needed to produce graphic output on electrostatic printer/plotters.

Graphware I is a 5 mhz control store processor that uses digital techniques to generate raster data from vector data, a spokesman explained.

Accepts Sorted Vectors

The interface I accepts sorted vectors as input and generates raster data for output to the firm's Statos electrostatic printer/plotter. It allows the particular application program to pass sorted file information from the host processor

directly to the interface without requiring additional computing to be performed on the vectors, he claimed.

Graphware I was designed to operate with any of Varian's 4000 series printer/plotters. It is supplied in a rack-mounted or stand-alone con-

figuration.

The unit costs \$4,850 and comes with 1K byte of memory, which provides for 160 current vectors. It can be configured with up to 32K bytes, the spokesman noted from 611 Hansen Way, Palo Alto, Calif. 94303.

Free Pamphlets Available

Six firms are offering to readers free brochures or pamphlets describing their products and services.

The Computer Products Division of Electronic Memories and Magnetics Corp. (EMM) is offering an application note describing an insurance company's selection process and ben-

efits of add-on memory for the IBM 370/155. "User Notes No. 1" can be obtained by writing to EMM at 3216 W. El Segundo Blvd., Hawthorne, Calif. 90250.

A four-page brochure describing the System 200 Record Processor by A.B. Dick/Scott is available from the company at Alford St., South Hadley, Mass. 01075.

Tandem Products

A 12-page brochure explaining the hardware and software organization of Tandem Computers, Inc. systems is available from the firm at 20005 Valley Green Drive, Cupertino, Calif. 95014.

A magnetic media maintenance equipment buyers catalog is available from Richard Hurley at Kybe Corp., 132 Calvary St., Waltham, Mass. 02154.

Applied Color Systems, Inc. has a bulletin describing its Spectra-Sensor continuous curve plotter. The bulletin can be obtained by writing to the firm at P.O. Box 5800, Princeton Service Center, U.S. Highway No. 1, Princeton, N.J. 08540.

Guildon Industries, Inc.'s AP-20 thermal printer is described in a four-page catalog the firm is offering from its Measurement & Control Systems Division, East Greenwich, R.I. 02818.

Correction

The first two parts of the "Merged Technologies" series [CW, July 25, Aug. 1] were coauthored by Frank Malabarba, a computer specialist with the U.S. Navy at Indian Head, Md.

ed graphics terminal computer's power. or's patience.

Six images that warrant some serious comparison shopping.

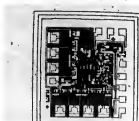
A quick look at basic viewing capabilities and you'll soon discover there's not a more versatile graphics terminal around than the CalComp IGT-100.

100's introductory price is super-competitive. Especially compared to storage tube devices. (And there's an equally attractive leasing plan, too.)

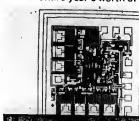
But we didn't stop with just a great terminal at a great price. We added an entire year's worth of



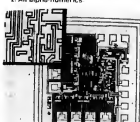
1. All alpha-numeric



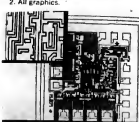
2. All graphics



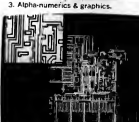
3. Alpha-numeric & graphics



4. Graphics & View window



5. Alpha-numeric, graphics & View window



6. Alpha-numeric, graphics & View window

To begin with, the IGT-100's special three-way, split-screen design provides you with separate alpha-numeric, graphics and view-window sections.

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service — labor, parts, everything — to the deal. Right along with the finest graphics terminal support software. It's even compatible with standard CalComp plotting software and Plot 1.0.)

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Citibank Minis Survive Blackout Easily

By Esther Surden
CW Staff

NEW YORK — What happened when last month's blackout hit Citibank's myriad of minis?

The systems performed admirably, according to spokesmen for the bank, which has a well-publicized policy of decentralization with small systems.

In fact, the minicomputers came through the blackout unscathed, prompting one vice-president to remark that his operation would have been really damaged if it was still running on a large batch-oriented main-

frame.

"During the blackout, I only had two machines with auxiliary power," Gary Geresi said. The vice-president of services management for securities systems noted "the rest were on floors that did not have the auxiliary power."

Geresi is in charge of 25 Interdata Inc., minicomputers that perform a securities processing application.

"When the blackout hit, we powered down the minis" to prevent surges, he explained. Staff was kept on duty around the clock to be available to test for

file integrity as soon as power returned.

Testing for power integrity was also performed during the blackout on the two operating minis. When the power was finally restored, the file integrity tests were completed and "we then ran Wednesday night's work."

"We were absolutely satisfied with the performance of the minis and no data was lost," Geresi said. By mid-morning Friday, we were up-to-date.

Nothing much happened to the six Digital Equipment Corp. PDP-11/70s in the National Banking Group either, according

to Nicholas Papanikolaw, vice-president of services management for that area.

The bank has its own telephone system that is powered by Consolidated Edison power and has limited battery backup. But the bank does keep Bell System phones in strategic places for emergencies, and that is how Papanikolaw was alerted.

"The first thing I did was secure the building" to make sure that those working in it were all right, Papanikolaw said. Then he proceeded to "power down all the minis" by pulling the main fuse. The DEC equipment was located on the sixth and 12th floors.

When power was restored, one system at a time was brought up. Only one of the PDP-11/70s sustained any damage, and that was the only system that was not processing at the time of the blackout, he said.

The memory board that was damaged was replaced easily and no head crashes or other major hardware problems occurred, he added.

Another vice-president in charge of several minicomputers, including three DEC PDP-11/70s and six Qantel systems, had a similar story to tell.

"The way we process, all of the minicomputers were shut down [when the blackout hit] except for the 11/70 on which we process our 'lock box' nightly updates, according to Jack Egan, vice-president, services management, World Corporation Group.

"The minis were not affected. The one 11/70 went down, but at the time it went down 90% of the work had already been processed."

The 10% of the checks yet to be processed were handled manually, he explained, and "we walked them over" to the Federal Reserve Bank.

"The 10% of the checks yet to be processed were handled manually, he explained, and "we walked them over" to the Federal Reserve Bank.

applications we had in mind." The Bank Investment Division uses the computer for a broad range of transactions that involve the preparation of buy/sell confirmations for all money market instruments, municipal bonds and government obligations. It also handles dealer, trading and portfolio escrow/collateral position accounting.

All types of special reports are generated. For example, trade date reports and settlement date reports are issued each day. Since a trade will be initiated on one day but the settlement doesn't occur until several days later, this has proved to be a much more reliable way than the previous "pen and ink" method to keep track of these activities, States

(Continued on Page 34)

Searcher Discovers Flexibility

By Esther Surden
CW Staff

CHICAGO — A switch from an IBM System 3/10 to a Univac 90/30 brought Law Bulletin Title Services here more processing power for its money while increasing its flexibility, according to George E. Chismark Jr., treasurer.

The firm runs a service for realtors, attorneys, bankers and title companies that provides judgment and lien searches for transfers of real estate.

Its parent company, the Law Bulletin Publishing Co., publishes the *Chicago Daily Law Bulletin* as well as a number of other newspapers, magazines and books.

Entering the title search field meant the company had to expand its DP capability. It developed its first DP operation in 1968 with the installation of IBM unit record punched card tabulating equipment to handle accounts receivable.

In 1971, a small card-oriented system 3/10 was installed to process other applications and general accounting. In 1974, a conversion was made to a disk-oriented 3/10 to accommodate subscription fulfillment services as well as enhance other applications.

Then, in 1976, the company began its search for a more powerful system.

"We were satisfied with our vendor and the product proved, so initially we looked to our own supplier," Chismark said. "We ordered a 3/12 until we found out it could not do some things IBM promised it could do."

The company then looked at Burroughs, Univac and Honeywell equipment and had "likely investigative conversations" with each of the vendors.

"My DP manager had previous experience with Univac" and since that firm, like IBM, was located "right across the street," the switch in vendors was likely to make no difference in service, Chismark stated.

The most important reason for



Computer file of judgments and liens is updated daily at Law Bulletin Title Services.

choosing the Univac system, however, was its flexibility and growth capability, he said. "This system can grow to a quarter of a million bytes of memory" and can accommodate 32 disk drives without changing hardware.

"With IBM and the other manufacturers, you have to

change hardware," he noted, and with IBM that change included a conversion.

Configured with a main memory of 48K bytes, two disk drives with 58.9 Mbytes of storage capacity each, a 500 line/min printer and a 500 card/

(Continued on Page 36)

In Security Trading Application

User Picks Mini Over Mainframe

PHILADELPHIA — An end-user department at Philadelphia National Bank (PNB) here is using a small business system to supplement its mainframes for its security trading application. When we decided to automate the Bank Investment Division at PNB, we discussed using the large central system, but decided against it for several reasons," Kenneth H. States, administrative officer, said.

First, the department was concerned about getting the information it needed when it needed it — "especially if a question of priorities arose."

It also wanted independence of operations from the large system so if anything went wrong with the mainframe computer, the department would still be able to

function. The bank's central DP department has one IBM 370/168 and one 370/158.

Further, the software programs the Bank Investment Division wanted required a highly specialized background, States recalled.

After a year of investigating the various business systems available, installation of a Basic/Four Corp. Model 400 was recommended by READQ Systems, Inc., a New York firm that specializes in software for financial applications.

"What was of particular interest to us was the fact that we could get the software programs we wanted," States said. "READQ had the experience we were looking for, and the Basic/Four system was suited for the

INTERNET WORLD

Switch From 1130 to Mini Eases DP Overload

By Ann Dooley
CW Staff

DEARBORN, Mich. — Peninsular Diesel, Inc. switched from an IBM 1130 to a Burroughs B1700 system because the company's rapid growth created the need for more core, disk capacity and total processing capability, according to George Mrla, assistant DP manager.

The system handles all the company's general accounting operations including payroll for about 300 employees as well as accounts payable and receivable, financial statements and general ledger, according to Gladys Moryc, DP manager.

Peninsular Diesel, a distributor for the Detroit Diesel Allison Division of General Motors Corp., has grown

from one small outlet with three employees to a network of 63 franchised dealers in the lower peninsula of the state.

The headquarters coordinates sales, service, parts, engineering and administrative offices.

The old system wasn't able to meet the growing demands that were being put on it, Mrla said, so "we looked at

everything that was out at the time and decided to go to Burroughs."

With the Burroughs mini system, DP operations could be cut to a single shift; now five programs can be processed at a time instead of the previous one, he said.

All of the staff was retained and absorbed so there was no problem there, Mrla continued.

When the system was first installed, the DP staff used Burroughs packages, but now "we do all our own," according to Mrla.

The system includes a 64K memory, 1M-byte disk storage, a 300 line/min printer, 600 card/min reader, a card punch, keypunchers and two disk packs, Mrla said. It is valued at \$100,000, according to Moryc.

Accounting information is input via Teletype and punched onto cards. The cards are then run through the minicomputer, which produces an invoice.

The invoice will be mailed to the customer or filed depending on the information and its use, Mrla said.

Other applications include inventory control for more than 18,000 new and rebuilt parts and forecasting and pricing, Moryc said. The Teletypes are used in dealer and branch facilities.

There was no problem in switching from one system to another, Mrla said. "We were operating both systems for a year before we went entirely over," he said, adding parallel operation is "the only way to fly."

Peninsular Diesel distributes 33 basic diesel engines in four different cylinder sizes for trucks, boats, buses and trains; a complete line of Allison automatic transmissions for on- and off-highway use; torque converters, marine gears, and custom-fabricated Detroit Diesel-powered generator sets and power units.

In addition to handling the work for Peninsular Diesel, the B1700 also processes accounts for its sister company, Clarke GM Diesel, Inc., based in Cincinnati.

User Picks Mini Over Mainframe

(Continued from Page 33)

said. "We have a fail report that tells us if a settlement has not been received when expected; we have a salesman blotter that tells us at the end of the day what each salesman has done. We have a purchase and sales blotter that control out each day."

Our financial location report gives us control over securities and lets us know where such securities can be physically located," he continued.

The system helps the division know what actually is in inventory and is useful in situations in which business people are trading the same blocks of securities. In all, the system generates 30 reports.

Soon the division plans to have a customer activity profile that will tell it what a particular customer does each month to determine what kind of business he's doing and how the bank can improve and expand its service to him.

Besides the Basic/Four CPU, the division's system consists of two CRT terminals, two disk drives, a medium-speed printer and a high-speed printer.



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Evangelical Group Finds Minis Minister to Donor Information

MADISON, Wis. — Two minicomputers, one at headquarters and one in a division, have helped an evangelical organization here gain control over its complicated donor information system, according to officials of the society.

Inter-Varsity Christian Fellowship (IVCF) ministers to students and faculty at 800 colleges, universities, nursing schools and other institutions. Important to financing this effort is a donor information system, according to Robert Ford, director of headquarters services.

IVCF began its DP history in 1969, when it contracted with a service bureau with an IBM 360 to handle the mailing program.

The organization, however, continued to grow at a rate that in the last several years has averaged about 25%. In 1971 various other programs were written and IVCF

switched to a Madison bureau with an IBM 370/145 VS system; finally the association moved to time-sharing on a Univac 1100.

When the time came to move DP completely in-house, IVCF looked at mainframes and minimakers alike, "but the prices the mainframes were talking about" eliminated them, David Sironi, DP director, said. Minicomputers seemed a logical choice and the fellowship considered General Automation, Data General and Varian systems, among others.

Sironi compromised some of his requirements — such as his stipulation that the programming be done in Basic — in order to get a system the organization could afford. At the same time IVCF came in contact with an OEM that recommended the Mini-Computer Systems, Inc. Micos system.

The DP manager went to the vendor's headquarters, became acquainted with the operating system and language and decided it would do the job. IVCF then contracted for a completely turnkey system, which was delivered to specification.

The software was even tested on the OEM's system before the organization received its hardware, Sironi said.

Operations began last July. Donations are now entered on the day of receipt four days out of five — Monday is usually an exceptionally busy day and often requires carry-over to the next day.

Receipts can be produced and in the mail within 48 hours, while address changes

Megamini Prices Cut

OCEANPORT, N.J. — Interdata, a unit of Perkin Elmer Data Systems, has lowered prices for its 32-bit Model 8/32 Megamini up to 23%.

The basic 8/32D with 256K bytes of mainframe memory now costs \$63,100, down 11% from its previous price of \$70,900. The 512K-byte configuration has been repriced at \$89,100, down 17% from the former \$107,400.

The 768K-byte version is now \$114,100, down 20% from \$143,900, and the 1M-byte version costs \$139,100, a 23% savings from the original price of \$179,900.

The price reductions are effective immediately, Interdata said from headquarters in Oceanport, N.J. 07757.

are also executed in that time span — both signs of effective list management, Sironi said.

The Micos system consists of a CPU with 64K memory, three 80M-byte disk drives, five CRT terminals, a 600 line/min printer, a 9-track tape drive and a printing terminal.

The cost? The operating system and equipment cost \$110,000 and the software \$33,000. Ford projected that

labor and service bureau savings will pay for these expenditures within four years.

The installation at the Literature Division at Downer's Grove, under business manager Herbert Criley, is much the same as at Madison. The division had done its own order entry and inventory

control software and added to this the accounts payable and general ledger packages developed by Mini-Computer Systems for Madison.

The Literature Division includes the Inter-Varsity Press, with 300 titles, a nine-times-a-year magazine, two bookstores and related operations. The computer services all accounts payable and the general ledger for the entire division and the order entry and inventory control functions for the press.

Searcher Finds Flexibility

(Continued from Page 33)

min reader, the 90/30 system provided the firm with 50% more capacity and speed than the 3/10, Chismark said.

Chismark anticipates a system upgrade to add more disk in the future.

When the system was installed, we were able to cut back from an eight-hour shift to five and a half hours," he recalled. However, because of requests for processing from within for management reports have increased along with the number of searches performed, the system has gone back to the eight-hour shift.

Ordered in September 1976, the system was up and running by Jan. 1. More than 200 programs were converted to the system with the aid of Univac in less than three months.

"Previously, searching public records to identify judgments and liens was a time-consuming and tedious process. But computerization of the records has eliminated these problems," Chismark said.

"Our reports are more accurate because a computer search eliminated the errors that can occur in a manual search," he pointed out. "In addition, we conduct phonetic searches in which the computer looks for names that sound the same as well as conventional searches for names with the same spelling."

Operated under the overall supervision of business manager Jeff Bope, computer operations are conducted by DP manager and programmer Mark Swanson, who directs a staff of three people.

To provide computerized judgments and lien services, Law Bulletin Title Services maintains a computer file of 700,000 names' related to

seven statutory years of data for any of 1.2 million parcels of Cook County real estate.

The data file is updated daily. Judgments and liens filed one day are microfilmed in the Cook County recorder's offices, punched onto cards and entered in the system so computerized searches for the data can be made the morning of the next day. About 400 to 500 judgments and liens are entered in the system every day.

When requests are made for judgment and lien searches, names of parties are entered in the system which prints out reports for each request. To ensure accuracy, the system uses an internally designed program to perform two separate alphabetic and phonetic searches on each name.

The alphabetic search finds all names spelled exactly as requested, while the phonetic search identifies names that are similar in sound to protect against misspelled or misrecorded entries.

Containing all pertinent information about any judgment or lien found to be of record, system reports are delivered within 24 hours following receipt of service reviewing copies of source documents are also made from microfilm and provided on request.

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The State of Indiana, Department of Administration, Data Processing Division, is soliciting sealed proposals on a financial basis for the purchase of a financial processing system. The system is currently installed and the rest on order from IBM Model 9 Computer System.

The proposal includes purchase from the State of an installed IBM 3101 Model 9 Computer System.

Proposals must be received in Room 507 of the State Office Building, Indiana Department of Administration, by 10:00 a.m., Local Time, August 18, 1977.

For additional information contact Charles E. Woodard (317) 633-4680.

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Radio Shack Retailers Z80-Based System

FORT WORTH, Texas — Radio Shack has introduced a fully assembled Z80-based microcomputer with keyboard, CRT terminal and cassette unit.

The TRS-80, which observers have expected for the last six months, retails for \$399.95.

The unit comes with 4K bytes of read-only memory (ROM) and 4K bytes of dynamic random-access memory (RAM). The memory is internally expandable to 12K bytes of ROM and 16K bytes of RAM. A total memory capacity of 62K bytes is possible with the system.

The terminal is memory mapped and all graphics and alphanumeric can be controlled by commands in Basic, according to a spokesman. The unit also features cursor control and automatic scrolling.

When creating text, the terminal gives 16 lines of 64 characters, which can be software-selectable to 32 characters. The graphics capabilities permit 128 by 48 picture elements.



Radio Shack TRS-80

The microcomputer has a built-in 53-key integrated Acil keyboard and an expansion port for additional memory and peripherals, he added.

The Radio Shack Level 1 Basic software resides in 4K bytes of ROM. It features standard Basic statements; floating-point arithmetic; numeric, array and string variables; graphics commands; and cassette save

and load commands.

Special commands include "Clear Screen," "Set X.Y," "Reset X.Y," "Point X.Y," and "Formatted Print." The display is 12 in. diagonal.

There are five current software applications packages available from Radio Shack. Blackjack and backgammon, with instruction sheet and a single cassette, is free. A cassette folder for payrolls of up to 15 people with a manual and sample instruction sheet costs \$19.95.

An education application, Math 1, covers multiplication, addition and subtraction and comes with a teacher's guide. It is priced at \$19.95 for a three-cassette portfolio.

A kitchen application consisting of menus, conversion tables, a computer directory and message center costs \$4.95, and a personal finance application consisting of seven cassettes costs \$14.95.

The microcomputer can be purchased individually for \$399.95; the system is available at Radio Shack stores nationwide.

Micro Bytes

APL Interpreter Contest Features \$1,000 Prizes

PETERBOROUGH, N.H. — Byte Publications, Inc. has begun "The Great APL Interpreter Contest" with one or more \$1,000 prizes for winners.

Contestants are free to write interpreters for any microprocessors they choose, according to a Byte spokesman. Entries will, however, be judged on suitability for use on small systems with a minimum of 16K bytes of memory, as well as "program elegance" and efficient use of space.

Entries must be in the form of a publication-quality manuscript which describes the implementation of the interpreter and includes source code and object code, he said.

Contestants should also submit machine-readable source and object code in the form of paper tape or cassette tape. Entries should be postmarked before midnight Feb. 28, 1978.

Persons interested in entering the contest should contact Carl Helmers or Chris Morgan at Byte Publications, Inc., 70 Main St., Peterborough, N.H. 03458, in order to be included in mailings of further information of the contest's progress.

Digital Design Course Set

WASHINGTON, D.C. — A short course on practical digital design and applications will begin Nov. 5 at George Washington University here. The course is designed for electronics technicians, hobbyists and others who are interested in understanding and applying digital design techniques, according to a spokesman.

The object of the course is to enable the student to develop skills for designing with digital circuits and to better understand the operation of digital devices. There will be greater emphasis on practical applications than on theory, according to the university spokesman.

The course, which costs \$180, will be held Saturday afternoons through Dec. 17. Prospective students should contact the Director of Continuing Engineering Education, George Washington University, Washington, D.C. 20052.

Tylog Mailing Label Software Designed for 8080 System

MIAMI — Tylog Systems, Inc. has introduced a general-purpose mailing label software package for 8080-based microcomputers.

The Micro-Label System creates mailing labels and can be used for similar label applications, according to a spokesman. The system was designed for nontechnical personnel.

The software is formatted to run on an 8080 processor using dual North Star Computers, Inc., minifloppy disk drives and a pin-feed or tractor-feed impact printer. The software permits the label files to be printed in more than one sequence; error editing and restart capabilities are also provided.

Each master file can hold over 540 records, with multiple files being used for longer

lists, the spokesman noted.

The program comes in seven modules including the Update module to add, change and delete to an existing master file or create a new file, the extract module, which creates a key file by name, Zip Code or Zip and name, and the Sort module, which sorts key files.

The Reorganization module reorganizes the master file and removes deleted records; the Print module prints mailing labels and results at any record; the Copy Module is used for general-purpose file copy; and the Read module was developed for general-purpose read and print.

The standard label format allows any length print line up to 132 columns with one to 20 labels across.

Program runtimes include an 8 sec maximum update response time, a 30 min maximum sort time, a 5 min maximum extract time and a 12 min maximum reorganization time, according to the spokesman.

Options include custom record formats, custom sorts and custom label height.

The standard software system costs \$500 and options cost \$40 each from the firm at 9805 S.W. 152 Terrace, Miami, Fla. 33157.

North Star MPU Has Floppy Disk Memory

BERKELEY, Calif. — North Star Computers, Inc. has introduced its Horizon microcomputer. Based on a Z80 microprocessor unit (MPU), the Horizon includes 16K bytes of memory; a disk controller with one or two Shugart minifloppy disk drives and full extended disk Basic; the vendor said.

A serial I/O port is included for connection to any terminal, with standard transmission rates, a spokesman added.

System options include additional disk drives, hardware floating-point arithmetic board, 24-line by 80-character upper and lower case CRT controller board and 16K memory board with parity check.

The controller board reportedly displays 480 by 250 resolution graphics on a TV monitor, the spokesman claimed.

The single-drive Horizon-1 sells for \$1,599 in kit form and \$1,899 assembled. The dual-drive Horizon-2 sells for \$1,999 and \$2,349 from the firm at 2465 Fourth St., Berkeley, Calif. 94710.

Infinite Micro Built With RCA 1802

MELBOURNE, Fla. — A microcomputer based on the RCA Comsac 1802 microprocessor unit (MPU) chip is available from Infinite, Inc. in either preassembled or kit form.

Features of the UC 1800 include built-in keyboard programming; digital hexadecimal display for address, memory contents and I/O port; front-panel control; 256-byte random access memory (RAM) externally expandable to 65.5K bytes RAM or read-only memory (ROM); and a single power supply.

Software included with the UC 1800 contains Keybug, a keyboard handler and debug program for generating and debugging programs. Documentation includes over 200 pages of material that covers both hardware and software.

A software library of diagnostics, games and macro-building routines is also available, Infinite said.

The UC 1800, as a complete assembly with cabinet and documentation, costs \$495. In kit form with complete documentation, it sells for \$389.

The UC 1800HK hobbyist kit, which contains all but the "garden-variety parts," costs \$129.95 and is intended for the experienced kit builder, according to a spokesman.

Infinite is at 1924 Waverly Place, Melbourne, Fla. 32901.

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A little over two years ago the first firm started in microcomputers: MIT's. By last August there were about 50 firms, all small. Today there are over 500 firms making microcomputer systems, accessories, peripherals and software — virtually all of them new companies.

Since projections are that the micro field will soon be larger than the mini and mainframe, perhaps it is time for you to check out what is happening. Sales are doubling about every four months, with no slowing down in sight — just in case you may be thinking ahead.

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In addition to technical talks and demonstrations of the newest micro techniques and systems, there will be a talk on how to open and manage a computer store and one on how to make big money in microcomputing.

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Board Game, Micro Meet In 'Code Name: Sector'

SALEM, Mass. — The microprocessor and the traditional board game have met in the form of Parker Brothers' game — "Code Name: Sector."

In the game, the players' opponent is the micro that governs the movements of the submarine rather than those of fellow players.

The object of the game is to sink a submarine whose movements are guided by a Texas Instruments Corp. 0970 series chip.

Distance Calculated

The distance between a player's destroyer and the submarine is calculated after each player's move and shown on a small display screen. The screen gives only the distance, not the direction, by which the two ships are separated.

When the submarine is sunk, the screen says "sub," a spokesman explained.

The submarine moves in a straight line until it approaches shore and then rebounds, heading in another direction. It moves one square every time a player shifts the position of his destroyer. The game accommodates four players.

Those wanting a more difficult game can initiate the "evasive" mode which allows the submarine to change directions randomly. There are 4,800 possible undersea positions, and the submarine starts at a different one each

time.

When a player feels he has found the submarine, he selects one of three depths at which to fire a charge. If the incorrect depth — or one not selected by the microprocessor — is chosen, the submarine fires at the destroyer, thus giving it a new position on the chart.

Players select the direction in which they move and can move up to nine spaces by pressing a button repeatedly until nine is indicated on the screen.

They then press an enter code and the micro assimilates the new position and divulges the distances between that particular ship and the submarine.

Teaching Mode

There is also a teaching mode, in which the submarine is in a preset position.

The game runs on either a 9V calculator battery or household current and a battery eliminator.

Prices are set by individual stores. However, a spokesman said prices are expected to range from about \$28 to \$45.

The game will be available in the fall.

Micro Ads

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The New PCMs — Part 3

Mainframers Not Seen in PCM Arena

By Molly Upton
CW Staff

NEW YORK — Established mainframers are unlikely to join the rush toward the plug-compatible mainframe market, according to computer industry securities analysts here.

And these mainframers should remain relatively unaffected if the plug-compatible manufac-

turers (PCM) and IBM engage in pricing contests, they indicated.

Control Data Corp. had unique motivations for entering the PCM mainframe business, they all agreed, such as a relatively small market share in mainframes and a bustling plug-compatible peripherals business.

In addition, James Blair, first vice-president of White Weld & Co., pointed out, CDC did not incur the development costs of the machine.

There was some disagreement about the source of the next entrants in the plug-compatible mainframe arena. Harry Edelson, vice-president of Drexel Burnham-Lambert, Inc., said there probably will not be any more Japanese firms, but added there could be more American semiconductor firms entering the fray.

However, William Easterbrook of Kidder Peabody & Co., Inc., thinks Japanese firms such as Toshiba and Nippon Electric Co. (NEC) might be more likely to enter sooner than American semi firms.

Fujitsu and Hitachi are, for all practical purposes, included in the PCM market since Fujitsu makes much of the Amdahl Corp. CPU and Hitachi and ITEL Corp. have reportedly agreed to provide a machine.

The mainframers don't have to play the PCM game because they are doing very well under the existing groundrules, Edelson remarked.

IBM is by no means finished with its attempts to make the PCM mainframers look like traditional competitors which have their own lines of software and peripherals, he continued.

The IBM 3033 was an attempt to discourage firms from rushing to join the PCM market, but it didn't wholly succeed, he said.

In the future, Edelson expects IBM to put firmware in its peripherals as well as its main-

frames. Thus the PCMs would be unable to hitch their CPUs to IBM peripherals and software. The PCMS have been offering

This is the last article in a series that attempted to examine and predict where plug-compatible mainframe manufacturers are going and what IBM is likely to do in response.

complete systems relying on IBM software and peripherals.

Blair feels the concept of firmware is more talk than reality. It's a conversation piece for the next three to five years, but it does make the user think twice.

Purchasers of PCM mainframes are getting a price/performance kicker through their hardware, but it remains to be seen whether they will forfeit a price/performance mid-life kicker through software, by having a PCM machine, Blair observed.

DBMS Services to Star In RCS Revenue Scene

By Toni Wiseman
CW Staff

MENLO PARK, Calif. — The market for data base management systems (DBMS) services is one of the most important — and fastest growing — segments of the remote computing services (RCS) industry.

By 1981, over one-quarter of RCS revenues will come from DBMS services, resulting in an average annual growth rate of 36% between 1976 and 1981.

Those predictions were made in a recent report by Input, a market research firm here.

"The ability for nontechnical (in a data processing sense) people to use DBMS services with minimal help from the vendor will prove to be the major oppor-

tunity area for RCS vendors," Input said.

The firm projected the market for DBMS services to nontechnical groups in large and very large organizations will grow from under \$70 million per year in 1976 to over \$530 million by 1981.

By Input estimates, large-scale service expenditures will rise from \$19 million in 1976 to \$29 million in 1981, a 9% average annual growth rate.

The expenditures of non-technical large users will grow an average of 31% annually, from \$67 million to \$533 million, while technical usage jumps, 22% from \$90 million to \$242 million during the five-year period, Input said.

If hardware were the basis for (Continued on Page 40)

COMPUTER INDUSTRY

CI Notes

Microdata Eyeing CMC Overseas

IRVINE, Calif. — Microdata Corp. has entered into a preliminary agreement to acquire the Computer Machinery Company (CMC) firms in Great Britain, France, Germany, the Benelux countries, Sweden, Denmark, Portugal, Spain and Italy.

Microdata would pay about \$11 million for the purchase, most of which would be in cash and the remainder in the form of convertible debentures and common stock.

Consolidated revenues of the CMC companies in the year ended Dec. 31, 1976 were about \$50 million. Microdata had total revenues of \$31.7 million in its fiscal year ended Aug. 31, 1976.

Threshold Gains Patent

WASHINGTON, D.C. — Threshold Technology, Inc. of Delran, N.J., has been awarded a patent for a device that improves the clarity of human speech so people can talk to computers.

The device allows an operator to pronounce numbers or spoken orders by taking into account breath noises, such as the tendency to exhale at the end of an isolated word and to inhale at the beginning.

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Market Exit Forecast for Some Mini Makers

By John P. Hebert

CW Staff

WOBURN, Mass. — The capabilities of minicomputers "will be just enormous" in the future, but some of the present minicomputer vendors may not be supplying them, according to a speaker at the recent conference here.

Those in the computer industry will see and possibly be affected by the exit of some of the less established minicomputer vendors as they reassess the role of component manufacturers, according to Leonard Farano, executive vice-president of Gambit Management Strategies, Inc.

This migration from the minicomputer ranks will be made by those companies not willing "to accept the role of being dwarves" — a role forced by more competition from the main-

frame vendors, Farano said.

The minicomputer has enjoyed and will continue to enjoy a wide success because it helps the user do a better job by tying him to needed data — it brings the user closer to the information, he said.

It doesn't matter that that machine is a minicomputer, Farano said. It could easily have been a mainframe, except that mainframes have too much power and cost too much.

Communications is still "too long a way from being perfect" to allow the next best thing, he added.

Moving on to other forecasts, Farano predicted users will see a leveling in the price of core memory in the near future, although semiconductor memory prices will continue their downward cost trend.

Disk drives are merely electromechanical devices whose density will quadruple over the next four years, but whose prices will only drop by 50%, Farano said.

Terminal and printer prices will also level off because the technology has reached a practical and optimum level in terms of the end user.

And while computational costs have dropped tremendously, the cost of communications has only decreased 2% annually in the last few years, he noted.

Communications will be the single most important factor in the rise of the minicomputer, according to Farano, who asked why anybody would "mess with the telephone company" when they could have a local data base.

But, in view of the advantages of

minicomputers, "there are many DPs among us [who] want to hang onto the things of the past — such as large compilers and a data base," Farano said. Minicomputer vendors, like automobile manufacturers, have crammed all the "big car features into compacts" because people want luxury regardless of economy.

Operating systems have gotten larger and marketing terms such as "virtual storage" only serve to keep users conscious of equipment obsolescence, he said.

"Only now are we seeing operating systems which help users avoid monstrous conversions" when they need more capabilities, Farano said, referring to the nonexistence in the past of "upward compatibility," another marketing term.

At the minicomputer end of things, vendors have not had the end user in mind during systems design. The user wants the computer to be a reliable tool to be used purely as a utility, like the telephone. "That's the way it can be successful," he remarked.

Farano said he views the minicomputer manufacturers as "innomongers, when we would only like to see them make good operating systems."

they can't afford to lose market share. It's a matter of how much effect such a move will have on one's margins, he said.

So far, elasticity of demand has compensated for the reduced margins, he observed.

Blair is also impressed with the demand elasticity. PCMs are not displacing previously installed machines, he noted, but represent additional processor power, contrary to the situation six or seven years ago.

The demand stems from the trend to decentralization, Blair said, adding this represents opportunities for the other mainframes as well.

At least temporarily, Blair is bullish on PCMs. The price elasticity has created such a backlog for IBM that the ability to deliver quickly is more important than the price of a machine, he said.

DBMS Services to Star in Revenue Scene

(Continued from Page 39)

put forecast. Small users will also show considerable increases in use; increasing their expenditures from \$26 million to 1976 to \$147 million by 1981, the report said.

"Because of the ways of packaging DBMS services, there is high 'value-added' and profitability potential for vendors in their use," Input stated, noting the fastest growing of these packaging strategies is the development of prepackaged applications by vendors using their DBMS services, a market which accounted for less than \$10 million in 1976 but which should reach over \$240 million in 1981.

Rapid Implementation

"Of fundamental importance to computer services vendors, users are becoming aware that no one [DBMS] will satisfy all their requirements. Further, the desire to rapidly implement applications to access and use data bases is spreading through organizations like wildfire."

"In-house DP departments are finding meeting this demand extremely difficult," the report observed.

The improvements in price/performance of processing and storage are reducing the importance of inefficiencies in hardware use when a

DBMS is employed, the study noted.

"However, poor performance in standard DBMS, such as [IBM's] IMS, will be ameliorated by conversion of key code routines into firmware through shifts in the HFS boundaries." Input stated, adding that future mainframes will have specialized processor functions for DBMS.

Marketing Strategies

The largest and fastest growing DBMS services are all proprietary, the report said, noting only one of the seven RCS vendors with more than \$5 million per year in DBMS revenues uses a third-party DBMS. McAuto uses IBM.

Input suggested five product marketing strategies that vendors can employ in their "value-added" campaign:

- "Self-help," in which the vendor adopts the commodity approach of putting up a DBMS, usually a third-party one, and lets the user go it alone.
- "Language," in which the vendor focuses on customers who intend to do much of the development work themselves.

• "Tool," in which the vendor sells ongoing analytical and inquiry — rather than development — capabilities.

• "Custom programming," in which the vendor uses the DBMS and its own

programming staff to develop and operate an application for a customer.

• "Prepackaged applications," in which the vendor uses its DBMS services to develop generalized applications programs which are then implemented for individual customers with modifications.

Not for Mainframers . . .

(Continued from Page 39)

profitability, then it could be argued the Japanese firms would do very well, he conceded.

None of the analysts were very concerned about the effects on the other mainframers of a price war between IBM and the PCMs.

IBM would be affected, but the other makers have a 50-80 chance of remaining unscathed in the near term, according to Edelson. They would be affected only if IBM decides to thwart the competition by cutting prices more than it normally would, he said.

There is a great degree of demand elasticity for large computers, he continued. For instance, if lower prices increase the demand by 1% or 2%, that would be sufficient to keep everyone's growth intact, he said.

It looks as if all the mainframers will keep pace with IBM's pricing because



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Turn to Packaged Software

South African Users Tighten Belts

Special to CW
JOHANNESBURG, South Africa — Faced with an economic recession and the recent increase in import duties on computers, computer users in South Africa are turning to service bureaus and packaged software to increase their productivity. In addition, users are replacing large mainframes with a number of small computer systems to reduce costs and gain efficiency.

According to local experts, there are about 1,500 general-purpose computers and about 2,500 minicomputers in South Africa with total installed value of about \$600 million.

The commercial and industrial organizations using these systems have been under budgetary pressure caused by the current economic recession, attributable to reduced international investment in the country and lower export levels.

The recession is attributed by local businessmen to the recent slowdown in economic growth in Europe and the international political and economic pressure being applied to South Africa from countries which disapprove of that government's racial policies.

To maintain DP output levels at little or no budgetary increases, and in some cases to achieve budgetary decreases up to 10%, DP managers have been turning to performance monitors, sort and other utility packages and increased use of outside services to increase their departments' productivity.

Software sellers interviewed here indicate sales are up 30% to 40% so far this year. Also, programming and systems consultants and service bureaus report substantial gains.

In contrast, mainframe

users have been experiencing a difficult time. IBM, after seven years of good business growth, was substantially off its order and revenue targets for 1976, and informed sources say DP sales continue to be slow.

Escom, an electrical utility,

International
News

recently ordered 30 ICL 2903 small systems to distribute preparation of electricity bills, replacing a number of IBM mainframes in the process.

IBM has about 50% of the South African computer market, while ICL, the second leading supplier, has 25% of the market. The rest is distributed among Univac, Control Data Corp., NCR & Burroughs.

The level of computer sophistication is considered quite high in South Africa. Because the principal cities — Johannesburg, Capetown and Durban — are quite distant from each other and telecommunication costs are attractively low, South Africa operates some of the most advanced and sophisticated data communications in the world.

Opposition to South Africa's racial and separatist policies in the U.S. has caused U.S. computer makers some uncomfortable moments.

IBM's chairman Frank T. Cary was closely questioned at the recent annual meeting on his company's operations in South Africa. He reiterated IBM's position that it cannot impose U.S. policy through restricting use of its computers in other countries, although it would not sell a computer which it knew was intended to be employed for illegal or immoral purposes.

Presumably, local community standards apply in interpreting these judgments. A recent U.S. visitor noted the current largest advertiser in the DP press in South Africa is the Anglo-American Corp., a major gold mining firm.

It is using four-page spreads to recruit personnel for the development of a Human Resources Information System, to be implemented on two IBM 370/158 computers. This system, which will employ some 300 on-line terminals, is described as enabling the management (in all senses) of the migratory black work force of over 130,000.

Spring Expo in Paris

PARIS — The U.S. Department of Commerce is sponsoring "Printemps Informatique," an exhibition for computers and related equipment to be held at the U.S. Trade Center, here from March 14-17.

Recently completed market research indicates France is an excellent market for American computers and related equipment. French expenditures for computers and peripheral equipment exceeded \$1 billion in 1975 and are forecast to surpass \$2 billion in 1980.

Continuing demand for new information-processing hardware by busi-

ness and government should support an average growth of 16% a year in this market during 1975-80, Commerce said.

Imports, which have accounted for almost half of the DP equipment purchased in France in recent years, are expected to maintain their overall market share and are projected to rise above the \$1 billion mark in 1980 to represent about 47% of the total market.

For information, contact Helen Burroughs, U.S. Department of Commerce, Room 6318, Washington, D.C. 20230.

European CPU Spread Seen Stable

By Molly Upton

LONDON — The distribution of various brands of CPUs among industry sectors in Western Europe has remained nearly constant over the past two years, according to a study in IDC Europa Ltd.'s EDP Europa Report.

Manufacturing has remained the largest user sector throughout Europe and showed the fastest growth in the Benelux countries and in Switzerland, the report said. IBM had the highest percentage of its base in the process and durable goods manufacturing sectors — 46%.

Burroughs had 28% of its base in manufacturing, Control Data Corp. 15.7%, Honeywell-Bull 15%, ICL 34%, NCR 33%, Univac 39% and Siemens 30%, according to EDP Europa.

In the Benelux countries the distribution of computers in the manufacturing areas jumped from 33.7% to 45.9%. In Switzerland the jump was from 35.6% to 40.1%.

Although Scandinavia's

process manufacturing grew from 14% to 19.6%, durable goods manufacturing's share of computers dropped from 25% to 16.3% for an overall decline — from 39% to 35.9%.

In the UK, expenditures for computers and peripherals should grow relatively sharply in the banking industry by 1980, according to the report. For instance, from the 1974 estimated outlay of \$58 million, UK banking will probably spend \$140 million in 1980. As a percentage of various segments' DP expenditures, banking's share will rise from 8.5% to 11.5% to rank

third behind manufacturing and government.

Although expenditures for manufacturing will continue to increase, the percentage will decline from 28.5% to about 21.9%, the report noted.

Manufacturing expenditures for DP in the UK were \$195 million in 1974 and are projected to be \$260 million in 1980, according to EDP Europa.

Government will continue to hold its second place share with 14.5% in 1980 with equipment valued at \$176 million.

Commerce Slates Expos

WASHINGTON, D.C. — The U.S. Department of Commerce will stage a tandem pair of exhibitions of electronics production and test equipment in France and Germany in November.

The shows are an effort to help U.S. manufacturers increase their share of a Western European market.

The first show will be held

Nov. 14-17 at the U.S. Trade Center in Paris. The second will be Nov. 22-26 at the international "Productronica" congress and exhibition held biennially in Munich.

Additional information is available from the Bureau of International Commerce, Room 1015-C, U.S. Department of Commerce, Washington, D.C. 20230.

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Data 100 Boosting OEM Sales, Production

By Molly Upton
CW Staff

MINNEAPOLIS — Data 100 Corp. expects its OEM operations to contribute about \$20 million in revenue in fiscal 1977, according to John Roy, general sales manager for OEM.

OEM sales account for between 70% and 75% of the units marketed to the OEM and the rest are consumed by Data 100 end-user products, agreed Roy and Gerry Kaplan, director of marketing support for OEM.

In 1976, Data 100's revenues totaled \$121.9 million, of which \$75 million came from sales, the annual report indicated.

Data 100's principal OEM product lines are SM- and 10M-byte cartridge disk drives and line printers from 62-

to 600 line/min.

The firm is well positioned to enjoy the projected OEM market spurt in printers in the 60- to 250 line/min range, Roy indicated.

Market surveys forecast these line printers should grow from 4,000 units/year in 1976 to 18,000 units/year in 1980.

Began Entry in '74

Data 100 began its entry into the OEM market in 1974 as it sought to vertically integrate its production and also to diversify, Roy said.

For Data 100, the OEM area represented a different market, one which was not least-dependent and not dominated by IBM.

Late in 1974, it acquired Odec in

Warwick, R.I., which had line printers from 62- to 300 line/min. Then in September 1975, it bought Jomec, which had a wide range of product lines. Data 100 sold some of these lines, such as the paper tape and Portaversers, and discontinued others, Roy said.

The disk products were transferred to Minneapolis earlier this year. In July, the firm produced more drives than Jomec had in a month, he said.

At Warwick, the printer line was revamped and new products were brought out. The product line has "changed dramatically," principally through building in reliability and "getting out of the product what was potentially there," Kaplan said.

"We've tried hard to establish ourselves as a quality supplier," which

means providing service and various interfaces, Roy indicated.

For example, Data 100 will provide field service for its printers.

Kaplan explained that often customers are not initially real OEMs with their own service force, etc., "so we try to offer more in support."

Non-OEM Products

There are some products Data 100 manufactures but does not offer to the OEM, such as a CRT and the mini used in its remote-batch systems.

Roy said the firm draws lines at what it feels it can effectively offer in the OEM marketplace.

In the disk drive area, the firm has seriously looked at higher capacity drives, Roy said. One thing that has held it back is the lack of unanimity in the industry on what technological approach to take, he said.

He conceded the firm could lose market share by its lateness in developing such a product. But, he added, just as Data 100 got into the disk business through an acquisition, the same approach might be a viable way to enter the larger capacity disk drive market.

size of the printer plant, and the addition is expected to be completed this year, Kaplan said.

Roy said Data 100 is looking at the strategy of offering a full line of printers. However, the low-speed arena is moving toward lower prices, which could mean diminishing returns, he observed.

Data 100 is less enthusiastic about the low end than it is about the speed range of 100- to 1,000 line/min, he indicated.

The boom in printers in the 100- to 300 line/min range is a reflection of the increased demand for small business systems. Several other firms, such as Centronics Data Computer Corp. and Dataproducts Corp., recently introduced products in this range, Kaplan observed.

"Clearly they're moving in the direction we've been going in the last three to five years. Obviously this will cause us to do some things to be competitive, but this is the area in which we're dominant."

Data 100 is already starting to feel the positive effects of increased competition, he indicated. For instance, other firm's customers are looking at all offerings — including Data 100's — in that particular speed range. "It's opening up some doors," he added.

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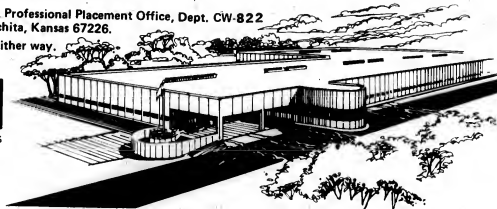
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8K Eproms Bow

SANTA CLARA, Calif. — Electrically reprogrammable read-only memories in 8K bits are available from National Semiconductor Corp. for \$32.75 each in lots of 100.

The MM2708 is a 24-pin NMOS device with a transparent lid. It is organized into 1K, 8-bit words, features typical programming speeds of 100 sec for all 8K bits and maximum access time of 450 nsec, the firm said.

The bit pattern of the MM2708 is erased by exposing the transparent lid to ultraviolet light, and a new pattern can then be written into it, the firm added.

National Semiconductor is at 2900 Semiconductor Drive, Santa Clara, Calif. 95051.

Micro Developers Get Expanded Support

BEAVERTON, Ore. — Tektronix, Inc.'s 8002 Microprocessor Lab enables developers to work with the 8-bit Intel 8080, Motorola 6800 and Zilog Z80 micros as well as with Texas Instrument's 16-bit 9900.

The 8002 provides an operating system which includes a text editor, assembler software for the selected micros and control, command and storage instructions, the firm said.

With the same development system users can evaluate different micros for a single application or several projects with different micros, Tektronix added.

The 8002 cuts debugging time and provides for interaction of hardware and software, thus helping eliminate finger pointing between the hardware and the software, a spokesman said.

The basic unit sells for \$9,950 and includes a processor with 16K of system memory, 16K of program memory and a dual floppy disk unit as well as two

Microcosm

assembler software packages.

Options include real-time prototype testing, hardware debug with break-points and 8-channel logic analysis.

Other options are a software-driven Prom programmer and up to 64K 8-bit words or 32K 16-bit words in additional program memory, the firm said.

A minimum software development system with a thermal printer costs around \$12,000, while a full system

with CRT and printer is around \$22,000, a spokesman said.

The 8002 is supported by the Tektronix field service organization.

Tektronix Lab Instruments Division, Logic Development Products may be reached through P.O. Box 500, Beaverton, Ore. 97077.

National Semi Looks Overseas

SANTA CLARA, Calif. — National Semiconductor Corp. has unveiled four CPU and memory cards with standard Eurocard size and bus configuration for use with the firm's SC/MP low-cost development system (LCDS).

The units allow fast construction of 8-bit SC/MP microprocessor systems destined for the European market, the firm said.

The cards are 160mm by 100mm and have 64 edge connectors.

The ISP-8C/100(E) SC/MP CPU card costs \$250 in single quantities. The ISP-8C/004(E) RAM costs \$225 and the ISP-8C/004 card with empty ROM/PROM sockets is \$125 each.

The ISP-8C/004(E) card with 4K words of memory is \$525 in unit quantities.

National Semiconductor is at 2900 Semiconductor Drive, Santa Clara, Calif. 95051.

I/O Units Added

SANTA CLARA, Calif. — Intel Corp. has added three analog I/O subsystems and an optically isolated digital I/O subsystem to its SBC 80 single-board computer family.

The analog I/O boards are program- and pin-compatible for the same functions, and all the subsystems interface directly with the SBC 80 system bus.

The SBC 732 analog combination I/O board with 8/16 inputs and two I/O conversion channels costs \$1,195.

The SBC 711 analog input board with 8/16 inputs costs \$750.

The SBC 724 analog output board with four D/A converter channels and the SBC 556 optically isolated I/O board each cost \$395.

Intel's OEM Computer Systems Group is at 3065 Bowers Ave., Santa Clara, Calif. 95051.

AMI Has Vmos RAM

SANTA CLARA, Calif. — American Microsystems, Inc. (AMI) is offering a 45-nsec, 1K by 1 bit static random-access memory (RAM) made from the V-groove metal oxide silicon (Vmos) LSI technology which, according to the firm, is price-competitive with bipolar devices.

The 54015-3 device costs \$6.20 in plastic in lots over 100 from AMI at 3800 Homestead Road, Santa Clara, Calif. 95051.

Wintek Lowers Prices

LAFAYETTE, Ind. — Wintek Corp. has lowered the price of its 16K-byte Wince random-access memory (RAM) module to \$399.

Other prices on the 6800 modules on industry-standard 4.5-in. by 6.5-in. circuit boards are \$339 for 12K, \$277 for 8K and \$199 for 4K from Wintek Corp., 902 N. 9th St., Lafayette, Ind. 47904.

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SLI Introduces Disk Drive With Winchester Heads

WOODLAND HILLS, Calif. — SLI Industries has announced the SLI Fox disk drive, which it said utilizes standard Winchester heads and media.

The unit includes deck plate, spindle, integral air filtration system, printed circuit board for electrical connection feed-through, disk cover and rotary positioner.

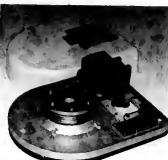
One to four disks can be mounted on the unit to allow a maximum of 70M bytes of unformatted data for each device, the firm said. The average access time is 40 msec.

SLI Industries said it has developed a

OEM Products

standard set of servo electronics to support this unit and has its own servo writing capability available in preproduction or production quantities.

The SLI Fox costs \$550 in OEM quantities from 21040 Victory Blvd., Woodland Hills, Calif. 91367.



SLI Fox

EMM Has Core For Rugged Sites

CHATSWORTH, Calif. — Electronic Memories and Magnetics Corp.'s (EMM) Severe Environment Products Division has unveiled the Sems-14, a core memory with a 32K by 18-bit basic module that stores 655K bits of data.

Operating speeds include an access time of 250 nsec and a cycle time of 600 nsec, the firm said.

Temperature range is -55°C to +85°C. Dimensions for each module are 6.4 in. by 9 in. by 1.4 in.

Bulk Memory Unit

A bulk memory unit can be concurrently developed to contain eight Sems-14 modules, power supply and interface circuitry and provide 256K by 18 bits of mass storage, EMM said. The quantity price is \$9,900 from the Severe Environment Products Division, 20630 Plummer St., Chatsworth, Calif. 91311.

GSI Has Autoloader For Floppy Diskettes

ANAHEIM, Calif. — General Systems International, Inc. (GSI) has introduced an automatic loader of floppy diskettes for use with its FDD 110 drive during certification and initialization processes.

The Model H155 horizontal autoloader permits processing of up to 30 diskettes without operator assistance, GSI said.

Data Transfer

The H155 can separate accepted and rejected diskettes into two bins. It can also be used for data transfer from cards, cassettes or tape to sequential diskettes for other tasks which require more memory than a single diskette can contain, the firm said.

Cycle time to load and unload the FDD 110 is less than 1 sec, a spokesman added. In single quantities, the H155 costs \$3,500 from GSI at 1440 Allee St., Anaheim, Calif. 92805.

IBM-Compatible Disk Bows



ANAHEIM, Calif. — An IBM-compatible double-sided floppy disk drive has been introduced by General Systems International, Inc.

Called the FDD 200, the drive's capacity is 1.6M bytes, unformatted, the firm said. Electronics necessary to perform data transfer using only the interface-specified control commands are included.

A software interlock, which guards against operator error during data transfer, adds about \$25 to the drive's price, which is in the low \$400 range for OEM quantities.

The firm is at 1440 Allee St., Anaheim, Calif., 92805.



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The first issue of the Index for example, covers the last six months of 1976, and it includes more than 4,000 entries by subject, author and name of any company mentioned. It breaks topics down into highly usable and convenient categories:

- There are entries by product or service, like **PRINTERS**, which has 37 entries in the six-month period covered, or **LEASING**, which has 10.
- There are entries by industry, like **INSURANCE**, under which there are 17 entries for various stories on the use of computers in the insurance industry.

• Types of computer applications is another way you can look something up in the Index. The category **INVENTORY SYSTEMS**, for example, has 21 entries.

• Regulatory, security and social issues are also indexed. There are 34 entries under **PRIVACY**, 10 under **PRIVACY ACT** and 9 under **PRIVACY PROTECTION COMMISSION**, for example.

• The Index also makes it easy to look into legal aspects of computer use with categories like **LITIGATION**, which has 24 entries in the last six months of 1976.

• Even foreign countries are indexed. The category **JAPAN**, for example, has 9 entries. ... and there are others: **KIT COMPUTERS** (the kind you build yourself) are the latest thing, and the Index shows 5 entries. **POINT-OF-SALE SYSTEMS** has 14 entries. ... and there's much, much more.

Company Names, for example, are a very important part of The Index. Looking under IBM, we find ten categories:

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World rank as DP market: *Fourth*
1975 DP expenditures: \$2.7 Billion
1975 imports from US: \$270 Million
Rank as importer from US: *Third*

Computer Management is a monthly magazine recently purchased by Computerworld, Inc. Monthly circulation is 30,000.

COMPUTERWOCHE GERMANY

World rank as DP market: *Third*
1975 DP expenditures: \$3.7 Billion
1975 imports from US: \$274 Million
Rank as importer from US: *Second*

Computerwoche is a weekly tabloid newspaper started by Computerworld, Inc. It has a circulation of 21,000 to the West German computer community.

SHUKAN COMPUTER JAPAN

World rank as DP market: *Second*
1975 DP expenditures: \$4.6 Billion
1975 imports from US: \$189 Million
Rank as importer from US: *Fifth*

Shukan is a weekly tabloid newspaper, jointly owned by Computerworld and Dempa publications. Circulation is 35,000.

ZERO-UN INFORMATIQUE FRANCE

World rank as DP market: *Fifth*
1975 DP expenditures: \$2.5 Billion
1975 imports from US: \$223 Million
Rank as importer from US: *Fourth*

Computerworld represents Zero-Un Informatique in the US. Zero-Un has three publications, one a weekly tabloid newspaper with circulation of 22,000; the second a monthly magazine, circulating 13,000 copies; and a new bi-weekly, Minis and Micros. All circulate throughout Europe's French speaking computer market.

DATANews BRAZIL

World rank as DP market: *12th*
1975 DP expenditures: \$250 Million
1975 imports from US: \$60 Million
Rank as importer from US: (Est) *10th*

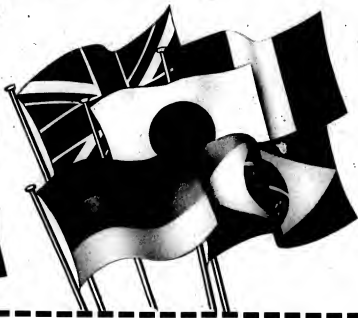
DataNews is a bi-weekly tabloid newspaper in Portuguese with an English-language summary. It is owned by Computerworld, Inc. and has a circulation of 7,000.



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One of the largest multinational companies in the world, must be familiar with data processing and administrative applications. 170 employees, experience and knowledge of "canned programs" applied to R&D electronics manufacturing. Special opportunity. \$3,000 FEE PAID.

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SYSTEMS MANAGEMENT DIRECTOR

SALARY: \$17,531

CLOSING DATE: August 31, 1977

Coordinating planning activities of all state data processing activities. Review and recommend acquisition, improvements and policy changes pertinent to data processing. B.S. Business Administration or related field, five years experience management responsibility, analyst/programmer work or first line user of a major data processing system. Data base management, information systems planning, and data communications experience helpful. Application must be received by SD Bureau of Personnel, Capitol Building, Harris, SD 57001 prior to closing date.

Equal Opportunity Employer

MARKETING REPRESENTATIVE DATA PROCESSING SERVICES

CBT Data Service Corporation, a subsidiary of the CBT Corporation, seeks an individual to be responsible for marketing automated services to business and professional firms. These services include payroll, accounts payable/receivable, inventory control and general ledger.

The individual selected will have had 2-5 years experience in the same field or one directly related, and will be assigned to a Connecticut territory.

Please submit resume including salary history and expectations to: Steven Bell, Manager, Professional Recruitment.

The Connecticut Bank and Trust Company

1 Constitution Plaza, Hartford, Connecticut 06105

An Equal Opportunity Employer (M/F)

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DECISION

CONSULTANTS
INC.

PROGRAMMER/ANALYSTS

GROW WITH DCI IN THE MIDWEST

Decision Consultants, Inc. is a young, dynamic, software consulting firm expanding its operations in several Midwestern locations.

We need people, who like us, are committed to challenge and excellence in the field of data processing. You must be self-motivated and have 3-5 years experience in IBM COBOL in business and manufacturing applications. Knowledge of CICS or IMS (DL/I) is a definite plus.

If selected, you will become a vital part of the DCI team functioning in all capacities of Data Processing in a software consulting environment.

We are offering competitive salaries and comprehensive benefits including company-paid insurance, tuition refund and overtime compensation.

If you are good and you know it, we want to hear from you. Call (COLLECT) or send a resume including salary history and requirements to:

A.J. Jablonski, District Manager
(312) 993-2810

DECISION CONSULTANTS, INC.

Suite 401, 5578 Higgins Rd., Rosemont, IL 60018
An Equal Opportunity Employer M/F

INFORMATION
SYSTEM CAREERS

Sperry Vickers, a Division of the Sperry Rand Corporation, is the world's largest manufacturer of hydraulic components and systems for the Aerospace, Marine and Defense markets. We are presently entering into an ambitious growth program and are seeking individuals capable of making significant contributions to our growth efforts. Positions are currently available for the following:

SR. SYSTEMS ANALYST

Position requires degree in Engineering, Mathematics, Economics or Computer Science. 3 to 5 years experience in manufacturing environment, systems analysis and/or related field. Also familiarity with Data Base Systems (DBMS/IMS), Data Collection and Unwired 1100 series.

PROGRAMMER ANALYST

Degree in Engineering, Mathematics, Economics or Computer Science. 2 to 3 years programming experience preferably with on-line manufacturing systems. Experience in COBOL and ASCII, Unwired 1100 series as well as Real Time Data Collection System preferred.

Both positions to play major role in the development of Comprehensive Business System and requires management potential. Respond in confidence to:

SPERRY VICKERS

AEROSPACE-MARINE-DEFENSE

P.O. BOX 10177
JACKSON, MISSISSIPPI 39206

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SYSTEMS
ANALYST

New England Nuclear Corporation, a prestigious world leader in the production of radiochemicals for research and diagnosis, has an immediate position available for a Systems Analyst. The individual we are seeking should possess at least 3 years experience working as a Systems Analyst with knowledge of business applications with prior experience in personnel systems, human resources or any of the packaged software offered in the personnel application areas. DOS and COBOL experience and any on-line systems exposure would be a plus.

As Systems Analyst you will be writing, documenting and designing both manual and computerized systems in a manufacturing environment.

New England Nuclear is a rapidly expanding company which offers a comprehensive benefits package and competitive salaries. Interested applicants please send resume and salary requirements to Janet Anderson, New England Nuclear Corporation, 945 Albany St., Boston, MA 02118.

NEW New England Nuclear

An Equal Opportunity Employer

EOP ANALYSTS

PROGRAMMERS/

COMPUTER OPERATORS

A major U.S. Company is offering a career opportunity to broaden their experience in the Middle East. IBM System 3 experience required.

EOP Systems Analysts with 5 years experience in ADP Systems Analysis, ADP Systems Programming, ADP Systems Maintenance, ADP Systems Design and Telecommunications. You'll also need proof of involvement in the development of a major automated system; strong proficiency in an ADP language (preferably military supply); familiarity with RPO COBOL and assembly; and experience with IBM 370/Systems 3.

Senior EOP Programmers Must have a year experience in ADP programming, knowledge of techniques, programming for telecommunications applications. Proficiency in COBOL, RPG, and assembly; proof of involvement with major systems programming effort; knowledge of IBM 370/Systems 3; ability to plan and manage large scale projects; BS degree in computer science or math desired.

Computer Operators with 3-4 years recent experience operating IBM 360/370/Systems 3; experience in tape, disk and teleprocessing systems and peripherals; and knowledge of RPG II and COBOL.

All positions offer excellent salaries and benefits like free housing, food costs, and travel allowances. Resumes must include IBM systems worked on, languages familiar with, and in-depth experience. Please indicate position on your resume and send in confidence to: CW BOX 3138, 997 Washington St., Newton, MA 02459. Equal Opportunity Employer M/F

SYSTEMS ANALYST
PROGRAMMERS

Position available at University Medical Center offering excellent opportunity for professional growth.

SYSTEMS ANALYST

Outlets include feasibility studies, general design, development and installation. Also responsible for hospital, S-V-T, and I-C-B. BCL, JCL. Three years minimum experience. Necessary degree preferred.

MGMT. ANALYST
- PROGRAMMER

Consult with senior analysts or design systems. Plan and debug complex programs. Must have COBOL and JCL. Minimum of two years experience. Degree preferred. TOP BENEFITS include 25 days paid vacation, yearly, free health and life insurance and 11 holidays. Please send resume including salary history to:

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University of Illinois
Medical Center
PERSONNEL SERVICE OFFICE
P.O. Box 8999
Chicago, Illinois 60680
An Equal Opportunity Employer

SALES ENGINEER
ILLINOIS BASED

Fabri-Tek, Inc., a major supplier of computer core memory stacks and systems, is seeking an experienced sales engineer for the midwest area, with offices located in Elk Grove.

If you have 3-5 years of direct selling experience of minicomputers, and/or microcomputer peripherals, or 3-5 years experience in selling memories, we would like to discuss this opportunity with you.

Qualified applicants should submit resume including salary history to D. Kelley at

FABRI-TEK, INC.

5901 S. County Road 18

Edina, Minnesota 55436

an equal opportunity employer

IMS DATA BASE
System Programmers

A unique opportunity exists in the Richmond, Virginia-based Management Information Services Department of Reynolds Metals Company. Successful applicant will become an integral part of a team responsible for the successful implementation of software to support a multiple CPU environment including an IBM 370/158 and an AMDAHL 470VS. Experience professionals having a thorough knowledge of VS2 BAL, COBOL, JCL with minimum of 2 years systems programming will find this a challenging position. A knowledge of DL/I TOTAL and other Data Base Management Systems a plus. College degree preferred. We offer a competitive salary and an outstanding fringe benefits package. Please send detailed resume in strictest confidence to:



T.J. Nash

REYNOLDS METALS COMPANY

8601 West Broad Street
Richmond, Virginia 23261

An Equal Opportunity Employer M/F

A major offshore engineering and construction company has the following positions available in its New Orleans, La. office

DATA BASE
ADMINISTRATOR

Responsibilities include definition, organization, protection and documentation of company Data Base activity, as well as strong user interface. Knowledge and experience of IMS/VS and VS 2 BVS/VS required. Data Base dictionary implementation desirable.

SYSTEMS
PROGRAMMER

Extensive experience in VS 2 (SVS) to work in performance evaluation measure. VS 2 (SVS) experience desirable.

SYSTEMS ANALYST

Responsibilities include systems design, user interface and development, planning and implementation of OS/VS systems. Project leader experience desirable. 5 years COBOL programming with 3 years systems design work experience in financial applications necessary. PL/I experience desirable.

BS degree in accounting or business disciplines necessary. These positions offer an excellent salary and fringe benefits package. Please submit resumes, including salary history, in complete confidence to: KAREN BAILEY.

J. RAY McDERMOTT & CO., INC.

P.O. Box 80035, New Orleans, LA 70160

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Technical Public Relations Specialist

This could be your opportunity to join Digital, one of the world's largest and fastest growing computer manufacturers, in a varied and exciting capacity. Our Central Public Relations Group is looking for a skilled public relations writer with computer knowledge to generate a variety of publicity materials for our product groups. Assignments will include preparing product-oriented press releases, in-depth tutorial and case history features for trade publications and newspapers, and generating information for visual media and book publishers.

The person we need should have a minimum of three years writing experience in computers and electronics, preferably with the trade press. A familiarity with photography as it relates to product publicity is desirable.

To investigate this position, please forward your resume to Bill Mersch, Digital Equipment Corporation, Dept. K322, 162 Main Street, Maynard, Mass. 01754.

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digital
digital equipment corporation
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SYSTEMS/PROGRAMMING PROJECT LEADER

Ore-Ida Foods, Inc., a national leader in the frozen foods industry, is seeking a Project Leader at its Boise, Idaho headquarters.

You will be responsible for the design, control, programming, maintenance, and documentation of online systems in an IBM 308 DSDS environment. You will have full responsibility for assigned projects to include supervision of programmers. You should be a strong project manager with proven analytical skills.

Applicants should have 5-8 years in data processing with at least 2 years online and data base experience. Experience in an IBM 308 DSDS installation is a plus. B.S. in computer science or equivalent degree preferred. Offer will include competitive salary, liberal benefits and paid relocation.

Send resume and salary history and requirements to Personnel Manager, P.O. Box 16, Boise, ID 83702.

An Equal Opportunity Employer

Ore-Ida

DATA PROCESSING PERSONNEL

One of the nation's most progressive hospital management companies is seeking experienced EDP personnel for the Louisville area.

PROGRAMMER

Assembler/COBOL experience required. Mini-computer experience desired, four phase experience a plus.

PROGRAMMER/ANALYST

3 years experience as Programmer/Analyst plus COBOL experience.

MANAGER COMPUTER OPERATIONS

3-5 years experience in large EDP installation to implement new projects.

Degree preferred but not required. Salary commensurate with experience.

We offer comprehensive benefits program including relocation, and outstanding professional and personal growth opportunities utilizing State-of-the-Art technology.

Send resume and salary history to:

Ed Wissmann

Humana
The Hospital Company
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Houston, TX (713) 661-8000
Los Angeles, CA (213) 536-1113
Louisville, KY (502) 261-8000
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Division of
Management Recruiters

ANALYST PROGRAMMER

Rapidly growing management consulting firm with offices in northern New Jersey and Philadelphia seeks a business-oriented individual with COBOL programming experience to join our professional staff. Send resume and salary history to:

R. Shriver Associates
120 Littleton Road
Parsippany, New Jersey
07054

PROGRAMMER/ANALYST

State University of New York, College at Brockport. Primary job responsibilities will include the implementation of new systems from the design phase thru coding, testing, and documentation of both an individual and team of existing systems. Qualifications: Bachelor's degree in computer science, math, or related field with 2-3 years of programming experience. Familiarity with standard business systems (Perceptron, payroll, etc.) and Burroughs hardware is desirable. The hiring salary range is \$12,750 to \$16,800 depending upon training and experience. Excellent fringe benefits and a growth oriented environment are available. All interested persons must submit their letter of application and resume complete with salary requirements to: Programmer/Analyst Search Committee, 2nd Floor, New Administration Bldg., Administrative Data Processing, S.U.C. Brockport, Brockport, N.Y. 14620 prior to Sept. 15, 1977. AA/EEOE.

D.P. CAREERS SPRINGFIELD, ILLINOIS

A State of Illinois human services delivery agency has the following openings:

PROGRAMMERS SYSTEMS ANALYSTS SENIOR PROGRAMMERS SENIOR SYSTEM ANALYSTS

Hardware consists of two IBM 370/158 and a 370/158 with a tape-reading network of 500 terminals using 2741 and 3270's with 4077 R.A.C. line.

Operating system of MVS/JES2. Also utilizing IMS, CICS, TSO, and AS/400 plus many other IBM, SNA and CDC devices.

Excellent opportunities for career growth and professional development. Agency is heavy user of the State's combined in-house data processing training center, one of the finest in the world in the area of computer training. Commensurate with experience plus complete range of benefits. Submit resume, including salary history, in confidence to:

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ILLINOIS DEPT. OF PERSONNEL
ROOM 502 William G. Stratton Bldg.
Springfield, Illinois 62706

TECHNICAL REPRESENTATIVE

COMSHARE, a rapidly growing international supplier of specialized computer services, has opened a position through staff expansion in New York for a Technical Representative.

This position provides an opportunity for a technically skilled person to advance their career.

Primary responsibilities will be in support and training of clients in personnel, financial and data management systems.

Applicants should feel comfortable acting as the main technical communications link with our customers and be able to function in an environment of problem solving and systems function to fit new applications. A minimum of one year of FORTRAN programming experience a must. Two years' business experience in a financial, manufacturing or statistical environment preferred.

Our Compensation and Benefit packages are among the finest in the industry. Local interview will be arranged in our New York office.

For more information, call or mail resume to Richard Reeves, (212) 687-3900.

COMSHARE, INC.

489 Fifth Avenue, Ninth Floor

New York, N.Y. 10017

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COMSHARE

only Engineers

TECHNICAL MANAGER SAN DIEGO LOCATION

To lead a group of 10 engineers and programmers engaged in the design of

**ON LINE HIGH-SPEED
MICRO/OCR
READER-SORTER SYSTEM**

The selected individual must have a broad background in the design of software and/or hardware for medium scale business data processing systems and their application in the field of financial data processing. Strong knowledge in all of the following is desired plus recent and successful design experience in at least two of them, preferably the latter two:

- MICRO/OCR READER-SORTER PERIPHERAL DEVICES
- READER-SORTER CONTROLLERS
- FINANCIAL APPLICATION PROGRAMS SUCH AS TRANSIT AND PROOF OF DEPOSIT
- SYSTEM SOFTWARE INTENDED OR EXTENDED FOR ON-LINE READER-SORTER CONTROL

The position involves direction of the ongoing design activities plus heavy coordination/consultation with OEM vendors of equipment handling devices, hardware and software quality assurance organizations, corporate program management, and other NCR divisions.

Technical management experience is essential as the design organization is expected to grow.

BSEE or BSCE or equivalent, MS desirable. Minimum of 10 years' applicable experience. Salary commensurate with ability and experience.

Employees will enjoy excellent salary and top working conditions with a commercial employer. Fully paid life, hospital and medical plan for employees and dependents.

To arrange an appointment for a personal interview immediately including salary history, training and experience to the Professional Placement Office at the address below.

NCR Data Processing Division
16575 W. Bernardo Drive
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(An Equal Opportunity Employer)

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COMPUTER SYSTEMS

M.I.S. INTERNATIONAL — an internationally-known computer systems integration organization — requires qualified professionals for top assignments in Michigan and Indiana.

Knowledge of the following computers is desirable:

- MINI-COMPUTERS: ModComp IV, CAL/LS-2, PDP-11
- LARGE COMPUTERS: B6700, IBM 370, H-6000

Top salary, fully-paid fringes including life, health and dental insurance, moving allowance and educational benefits. To arrange an interview, call or send your resume to Ms. Noree Mitchell.



M.I.S. INTERNATIONAL, INC.

31350 Smith Road
Romeulus, Michigan 48174
(313) 326-7010

We can give you 3 good reasons to call Robert Half for data processing positions:

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2. Robert Half specializes. We've been an integral part of the data processing community through all its generations.
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Chicago Software	22-26K
Wic. Prog.	16-18K

SYSTEMS

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Receivables Tr. Travel	19-21K
Administrative Inv.	22-24K
Consultant	20-22K

PROGRAMMER ANALYST

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Comp. Mainframe	19-17K
DDP	19-16K
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BAL. Learn new Assoc.	16-18K

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OS/Colol Heavy	18-20K
Build OS Systems	19-18K
Code.	19-18K
BAL. Learn	16-18K

All Fees Paid by Employer
E.O.P. Specialist
Call Tony Marconi C.E.C.
(312) 226-7660

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15 Spinnaker Wheel Rd.
Suite 228, Hinsdale, IL 60521

Due to Business Systems Research's steady growth, we have a continuing need for exceptional professional experienced

Programmers & Programmer Analysts

Ideal candidate will have a degree in business or computer science and one or more years experience on the DEC PDP 11 programming business applications in DIBOL and possibly COBOL or BASIC. PLUS. Applicant must have a thorough knowledge of business concepts, accounting functions and file structures, and should enjoy blending development and customer contact in a stimulating environment where your contributions have visible impact. If you can meet personal and professional challenges in developing interactive business applications and you would like to become a responsible member of a young, dynamic team of computer specialists, send your resume and salary requirements in confidence to:

BUSINESS SYSTEMS RESEARCH, INC.

451 Andover Street, Suite 304

No. Andover, MA 01845.

No phone calls please. Applicants respond only. We are an Equal Opportunity Employer

SYSTEMS PROGRAMMERS

Providing in-house information services to the entire Xerox organization is an unusually diversified, large-scale business. To do the job, we've built an organization of innovative, highly professional specialists who can keep our programming and software technology in every area at the most advanced level of technology. You'll find it an environment that stimulates ambitious people to reach their fullest potential — and provides the opportunity to do it.

Our current requirements are for systems programmers with significant professional programming experience. This experience would include recent responsibilities on a large scale 370/168 MVS environment, plus experience in IMS.

The openings are located in our suburban Rochester, New York data processing center. These positions offer excellent starting salaries, an outstanding benefits program including a profit sharing plan, plus liberal relocation allowances.

Xerox is an equal opportunity employer (male/female). If you are interested, please forward your resume including salary history and requirements to: Mr. Alan Myer, Xerox Corporation, Xerox Square — 803, Rochester, New York 14664.

XEROX

Senior Programmer / Analyst Mini-systems



In this home office based position, you'll be responsible for support of existing system 31s and system 7's in remote environments along with the responsibilities for the development and implementation of a mini-computer based distributive network. Majority of work will be analysis and programming with direct user interface. Assembler language on system 7 required. Career development will be with the implementation of mini computers in a distributive network.

Concurrent data processing environment is an IBM 370/168, on-line, IMS and TSO.

We offer a comprehensive benefit package and a chance for professional growth. Salary to low '20s. Very limited travel.

Please send resume, including salary history, in confidence to:

MS. JAN HAHN
PERSONNEL ADMINISTRATOR
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Framingham, Mass. 01701
Equal Opportunity Employer M/F

Programmer Analysts
San Francisco Bay Area
Compiler Development

Positions are currently available in FORTRAN, BASIC and COBOL. Compiler Development in both front-end and code generation area. Development includes compilers for the CYBER 170 under both the NOS and NOS/BE operating systems, and also work on CDC's next generation of computers. Applicants must have a working knowledge of assembly and/or block-structured languages and of compiler principles. A degree in Computer Science or related field is required, plus 1-3 years of experience.

Data Management Development

Involvement will be in developing, supporting and maintaining systems software for data management products. Immediate openings exist in CDC's record management and file conversion development, query update and data dictionary library. A working knowledge of assembly and/or block-structured languages is desirable.

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Immediate opening for an individual with experience in software performance measurement. The position in this area requires a degree and at least 1 year's experience.

We offer excellent salary and benefit programs, as well as dynamic and challenging work environments. For immediate consideration, send resume to: K. Hardy, Dept. 50-A, 215 Moffett Park Drive, Sunnyvale, CA 94066.



CONTROL DATA CORPORATION

An Affirmative Action Employer M/F

Sycor, Incorporated, a leader in the manufacture of distributed data processing systems, is currently seeking qualified individuals for systems programming positions.

SYSTEMS PROGRAMMERS

Minimum two years' experience as a Systems Programmer in any of the following areas:

- Data Communications
- Compilers and Languages
- Access Methods
- Data Base Management Systems
- Operating Systems

Experience in Mini/IBM computers with Assembler language is desired. BS in Computer Science or equivalent is a must. MS is preferred.

Please send resume with salary history to:

Gopi R. Jindal, Ph.D., Manager
Corporate Employment & Staffing
Sycor, Inc., 100 Phoenix Drive
Ann Arbor, Michigan 48104
(313) 995-1156

As an Equal Opportunity and Affirmative Action Employer, Sycor, Inc. Urges Females and Members of Minority Groups to Apply.

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BASIC/FOUR PROGRAMMER/ANALYST To relocate in Albuquerque, New Mexico. Total Bureau of the Basic Four small business computer. We are seeking a highly motivated individual, familiar with the Basic/Four computer, the Basic/Four programming language and the BASIC operating system. This is a permanent position with excellent earning potential. If you need the like very much to join a team environment with other data processing professionals at a top salary and relocation package, we offer a complete line of fringe benefits. And, most important, New Mexico offers numerous unique advantages with an unburdened life style. Send your resume and salary requirements in confidence to: Steve Williams, Director, P.O. Box 26027, Albuquerque, N.M. 87128.	DIRECTOR, INFORMATION SYSTEMS The Berkeley campus of the University of California invites applications for this new position. The Director plans administrative, financial, and information systems. Information systems officer. Applicants must have 10 years experience in including a year information systems management, solid technical understanding, a strong background in planning and a demonstrated ability to lead innovative, high-quality systems work. University of California, Irvine, California. Salary range \$28,000-\$36,000. Apply by September 15 to: Director, Computing Affairs, University of California, Berkeley, CA 94720. Affirmative Action Employer.	COMPUTER Tenfold market computers work better and faster. Our company, a leader in the unlimited world of computer enhancement, has the rare opportunity for: • Diagnostic programmer with a minimum of 3 years experience in communications and assembly level programming. • Technician hardware checkout, P. C. Board and documentation experience required. • Draftsperson at least 3 years P. C. Board, layout tape-up, logic diagram or assembly background necessary. Teletel is the right company at the right time and the right place for the exceptional applicant. If the challenge of success is your goal, send your resume in complete confidence to: D. E. White Vice President of Engineering Teletel Computer Corporation 17131 Daimler Street, Irvine, CA 92714 Equal Opportunity Employer M/F	PROGRAMMERS -- ANALYSTS DASO Computer, a Division of Data Systems, Inc., is seeking Software Product development and Control Systems Analysts. Positions are now open in the following areas: • Project Management • Project Leaders • Senior Analysts • Programmer/Analysts • Programmers DATA BASE CONSULTANTS We are looking for people with experience in any of the following categories: <table border="0"> <tr> <td>COBOL</td> <td>IMS</td> <td>IBM (DOS, OS, VS)</td> </tr> <tr> <td>PL/I</td> <td>IS</td> <td>AURORA</td> </tr> <tr> <td>FORTRAN</td> <td>IDS</td> <td>HONEYWELL</td> </tr> <tr> <td></td> <td>CDMS</td> <td>CDC</td> </tr> </table> This is an excellent opportunity for the right individuals. Benefits include free Crisis Line, Health Insurance, Life Insurance, Retirement Plan and an excellent Salary. We have offices in Milwaukee, Chicago, Houston, Los Angeles and Philadelphia. Experience plans for other cities are also available. We will relocate you to accommodate your career as well as DASO's plans. Please call or send your resume to our Corporate Offices at: 8708 North Port Washington Road, Suite 301 Milwaukee, Wisconsin 53217 (414) 381-2600	COBOL	IMS	IBM (DOS, OS, VS)	PL/I	IS	AURORA	FORTRAN	IDS	HONEYWELL		CDMS	CDC
COBOL	IMS	IBM (DOS, OS, VS)													
PL/I	IS	AURORA													
FORTRAN	IDS	HONEYWELL													
	CDMS	CDC													

NEW HAMPSHIRE RPG II PROGRAMMER

Career minded person wanted with at least 1 years RPG II programming experience. Excellent opportunity to work on your own developing new programs in a stimulating environment. Send letter and resume to:

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KENMORE STAMP COMPANY
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MILFORD, NEW HAMPSHIRE 03055

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CUSTOMER ENGINEERS

TANDEM COMPUTERS is actively seeking experienced customer engineers for New York, Washington, D.C., Miami/Tampa, Atlanta, Chicago, St. Louis, Omaha, Dallas, Denver, Phoenix, Los Angeles, and Toronto, Canada locations.

Successful candidates will be mature, self-motivating individuals who have a software background and at least five years of demonstrable experience in identifying, isolating, and repairing system malfunctions.

Daily work involves the total responsibility for and travel to customer installations for preventive and corrective maintenance procedures on all aspects of the entire system and associated peripherals. This responsibility includes the installation and testing of both upgraded and new software and hardware products.

TANDEM is a young, growing company specializing in multi-processor systems where the continued operation and data integrity is of utmost importance. If you believe you meet our qualifications, submit your resume and salary history in complete confidence to:

Mr. Jerry Everett
Customer Engineering Manager
Tandem Computers Inc.
20605 Valley Green Drive
Cupertino, CA 95014

TANDEM COMPUTERS, INC.

An Equal Opportunity Employer

BANKING

Item Processing

If you are interested in relocating in the Pacific Northwest and have extensive item processing programming experience with Assembler using CPCL, IPS or CPCL, we have a position available. Salary \$18,200-\$20,000. Send resume to:

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18111 1st Avenue, Suite 218, Bellevue, WA 98004
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21 START-AT-HOME D.P. BUSINESSES

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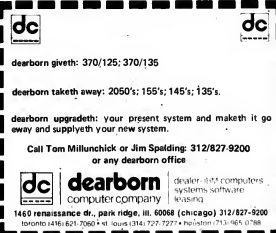
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